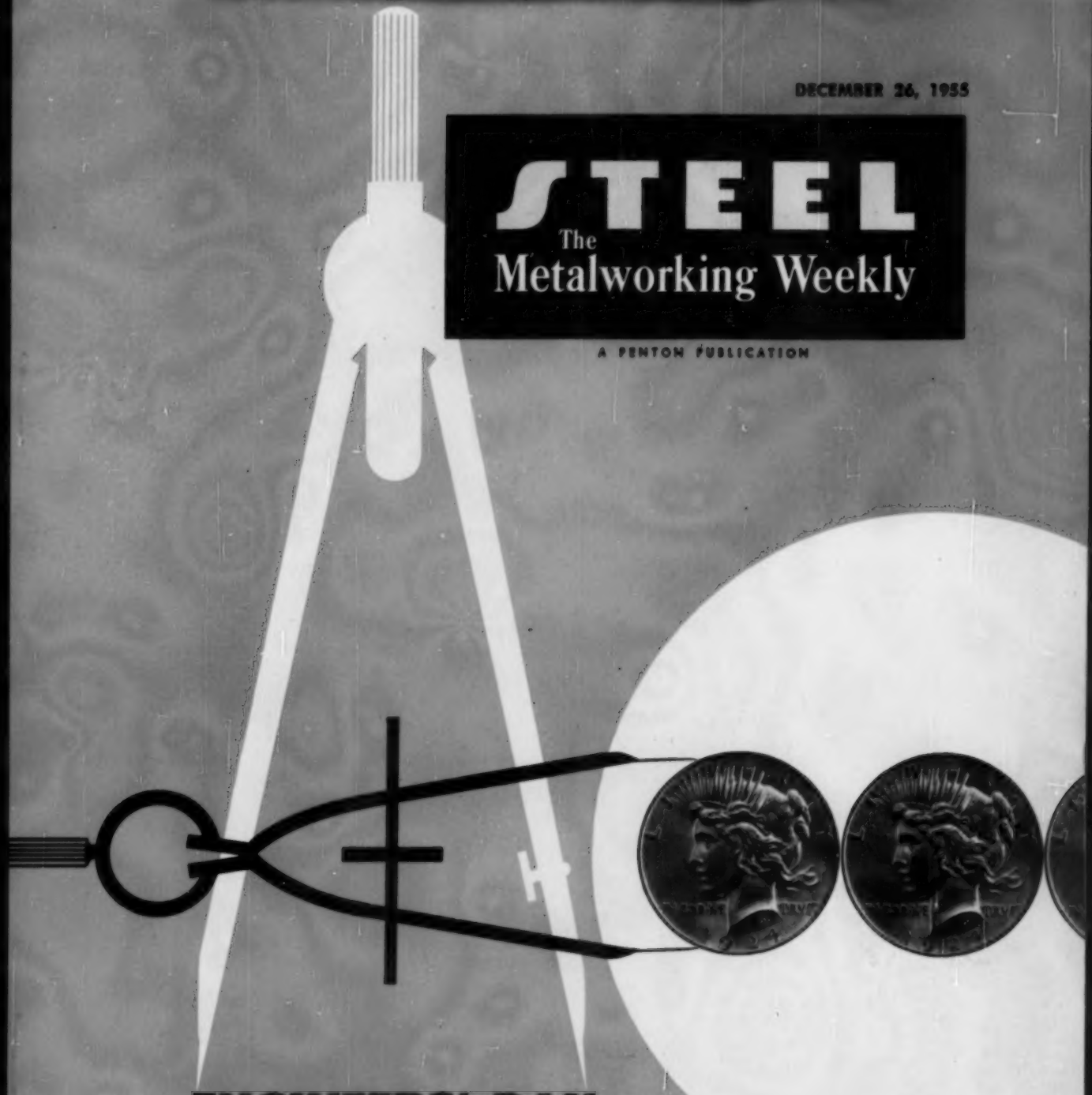
DECEMBER 26, 1955

STEEL

The Metalworking Weekly

A PENTON PUBLICATION



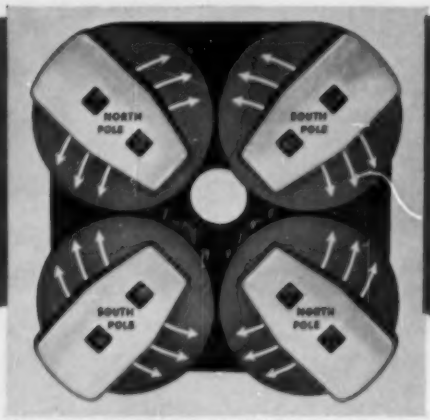
ENGINEERS' PAY

It starts high, but later progress often is slower. The situation is one of several causing unrest among engineers . . . page 29

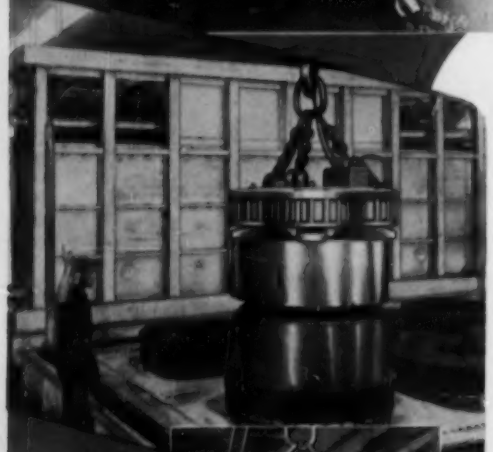
- **Boom in West Europe for '56, Too . . . p. 38**
- **How To Produce Pearlitic Malleable . . . p. 60**

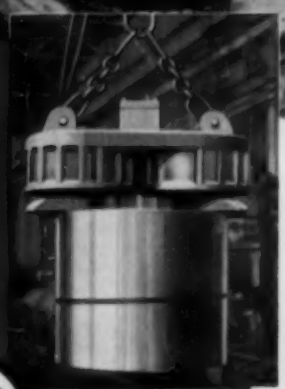
CONTENTS — PAGE 5

Protects the Surfaces--and Gives High Storage Capacity --remember the CSM Magnet for FINISHED COIL Handling.



LIFTS THE COIL—NOT THE HOLE. Poles directly over coil wall give high flux density at each pole shoe contact.





Exclusive Advantages of the CSM Design

1. Lifts coil without tilting—reduces chance of injury to bottom of coil when setting coil down.
2. Nothing adheres magnetically to bottom to injure coil when it is again set down. Does not disturb coil below when lifting top coil from the pile.
3. Operator can center magnet on coil easily—magnet does not hide his view of the load.
4. Magnet can deposit coil in or remove coil from confined passages without disturbing surrounding piles or objects—minimum overhang allows compact storing.
5. Permits high piles of coils—increases storage capacity over given floor area.

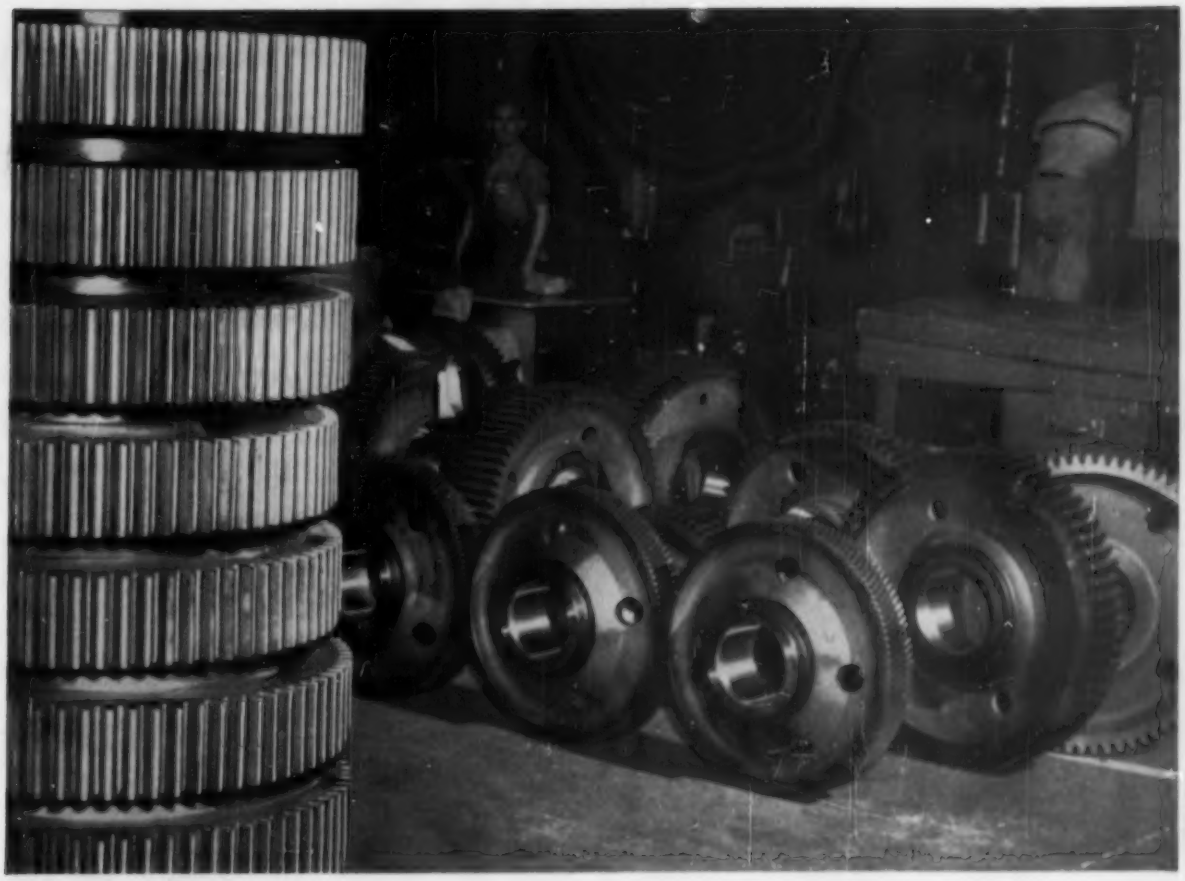
Type CSM Magnets are designed specifically to handle finished coils carefully and without delay. Coils are moved quickly and safely between roll stands and annealing furnaces—in and out of storage areas—and similar movements where protection of the finished product is paramount. Ask for Bulletin 902 which fully describes these magnets.

FOR A SPECIFIC PROBLEM PLEASE ADVISE

1. Inside and outside diameter of coil
2. Weight of coil
3. Gauge of strip
4. Type of coil (tightly or loosely wound)
5. How banded and how smooth on top (evenness of turns)

THE ELECTRIC CONTROLLER & MFG. CO.

4498 LEE ROAD ★ CLEVELAND 28, OHIO



Good, Strong Gears Begin with Good, Strong Blanks

Because strength is usually the first requirement in a gear, Bethlehem devotes unusual care to the making of gear blanks. And equally important, Bethlehem has developed a process of manufacture that assures high strength *without* excessive weight.

This process is unique; there is nothing else like it. First, a heated round is placed in a special mill where it is upset, forged and rolled in a single operation. The resulting blank is dense, homogeneous, compact; the grain flow of the steel is smooth and uniform.

These characteristics go hand in hand with strength. Moreover, blanks made by this method are easy to machine, and fewer cuts are required in a good many cases.

When making gears—spur, bevel, miter, helical, and others—you can rely completely on Bethlehem blanks. But their use is not confined to gears alone. In fact, they're excellent for a long list of applications —crane wheels, industrial wheels, turbine rotors, clutch and brake drums, sheave wheels, flywheels, pipe flanges, tire molds, etc. The blanks are available in sizes from 10 to 42 in. OD, and can be furnished treated or untreated.

If you would like more complete information, write for a copy of Booklet 216. It will be sent to you promptly without cost or obligation.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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#1 **IMPROVED SPHERICAL ROLLER BEARING...**

Size for size, more capacity and longer life than any other spherical roller bearing. Introduced by SKF two years ago; now available in the popular series. Already adopted by hundreds of leading manufacturers.

#2 **HIGHER CAPACITY CYLINDRICAL ROLLER BEARING...** With crowned rollers and cylindrical raceways, engineered for today's high speed—high load applications. Available with flanged or flangeless rings to meet design requirements.

Four of the Many SKF QUALITY PRODUCTS

It's easier and safer to buy from a SKF because a SKF makes an exceptionally complete line of ball bearings and roller bearings and spherical roller bearings.

#3 **"SY" UNIT PILLOW BLOCK WITH SUPERIOR BEARING SEAL...**

Red Seals, of DuPont "Fairprene", team with a rotating flinger to exclude dirt and retain lubricant. The "SY" Pillow Block is easy to mount—just slide unit on shaft, tighten two set screws. And the "SY" is interchangeable with existing installations.

#4 **QUIETER RUNNING SINGLE-ROW DEEP GROOVE BALL BEARINGS...**

With proven SKF Red Seals which keep dirt out and lubricant in. Available with any of 13 combinations of Red Seals, shields and snap-rings.

To Get The Most Valuable Book You Ever Had...

Catalog #390 — Complete technical and engineering data on SKF's complete anti-friction line. Send for your copy to SKF INDUSTRIES, INC., PHILADELPHIA 32, PA. — *manufacturers of SKF and HESS-BRIGHT® bearings.*

SKF®

BALL AND ROLLER BEARINGS

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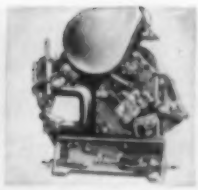
Horizontal Stroke Friction Saws

Down-Stroke Friction Saws

Hydraulic Power Units



Combination Shear, Punch & Coper

Punches

Bulldozers

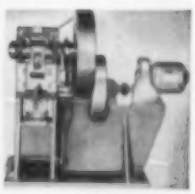
Beam and Column Millers

Plate Bending Rolls

Angle Bending Rolls

Double Angle Shears

Rotary Shears

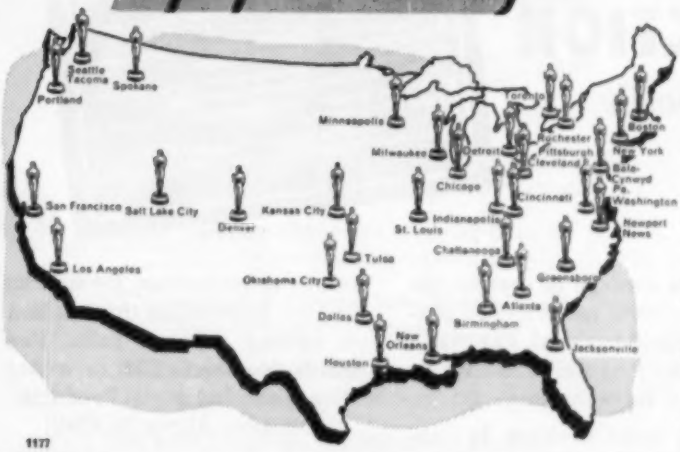


Guillotine Shears

Your Nearest KLING Distributor

WILL HELP YOU WIN "PRODUCTION OSCARS"

with Kling *Metal Working Machines*



1177

In more than 30 cities all over the country, there are Kling distributors who can show you these Kling Metal Working Machines and tell you about the citations they are receiving for production records in "the best of companies".*

Call the distributor nearest you; he will be glad to be of service to you. If in doubt which distributor to contact, write us direct. We will be happy to answer your questions and send Complete Line Bulletin 100.

**Let us send you a list of leading companies in your industry, that are users of Kling Machines.*

Since 1892

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KLING

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VERMONT See Massachusetts
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REASONS TO USE PLIOWELD
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2. Bonds permanently to metal surfaces—an exclusive Goodyear process
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6. Protects product from discoloration, iron pickup and other contamination
7. Each installation specially formulated to provide maximum protection against chemical handled

PROVED PROTECTION

for pickle line comes with

PLIOWELD

Acid tanks. Hot and cold water tanks. Tank covers. Piping. Drip pans. Fume ducts. Fume scrubbers. Exhaust fans. Stacks and breeching. These are the points in a pickling line that can be thoroughly protected against chemical attack with rubber bonded to metal—with PLIOWELD.

Secrets of the proved success of PLIOWELD in combating corrosion—and abrasion—are its availability in a range of compounds to meet specific needs and its permanent bond to metal. PLIOWELD does many jobs well and once on the job, it stays there.

Whether your problem is handling acids or alkalies, salts, alcohols, fumes, water or abrasive slurries, the G.T.M.—Goodyear Technical Man—can show you how to improve production and lower costs with PLIOWELD linings and coverings. He also can give you interesting information on rubber covered rolls. For details, see the G.T.M. or write: Goodyear, Industrial Products Division, Akron 16, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

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THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

STEEL
The Metalworking Weekly

DECEMBER 26, 1955
Vol. 137 No. 26

METALWORKING OUTLOOK, 23

The Editor's Views, 27

Trouble with Engineers, 29
The shortage brings serious side effects

Homebuilding: 7 Per Cent Dip in '56, 34
But dollar volume will stay high

Boom in Europe, 38
STEEL rounds up its annual series

Bright Outlook for Aluminum Weather Stripping, 32

Nonferrous Castings: 12-Per-Cent Gain in '56, 33

Piggyback Service Steps Up, 35

Hassel Over Freight Rates, 35

Windows of Washington, 36
Mirrors of Motordom, 43
The Business Trend, 47
Men of Industry, 51
New Products, 73
Behind the Scenes, 6
Letters to the Editors, 10
New Literature, 78
Machine Topics, 72

TECHNICAL OUTLOOK, 59

Heat Treating To Produce Pearlitic Malleable, 60
Wedding iron's castability to steel's strength

Blast Cleaning Automates Shearing Line, 63
For every ton of steel, $3 in savings

TV Automation Lowers Costs, Makes Jobs, 64
Labor saved is labor's gain

Rings Truer with Quench Press, 66
For jets, rings must be round and sound

Snap-On Couplings Cut Mill Down Time, 68

MARKET OUTLOOK, 79

Steel Operations, 79
Price Comparisons, 80
Nonferrous Roundup, 82
Nonferrous Prices, 84
Steel Prices, begin 86
Scrap Prices, 96

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Coming Jan. 2 IN STEEL

What Metalworking Expects in '56

Every December STEEL reports what the coming year will mean to metalworking in terms of sales and production volume, employment, expansion, etc. How? By quizzing 7600 general managers of metalworking plants. At this moment the replies are in, the results tabulated. Can you afford to miss what the country's top management men are thinking about metalworking's prospects for the coming year?

behind the scenes

Story Comes Under Hammer

When our editors go out after a story they really work. Dr. Al Gray, STEEL's technical editor, opened his investigation of plastic covers for machine tools two weeks ago by swinging a sledge hammer in the Gisholt Machine Tool Co. shop in Madison, Wis.

"The Gisholt people are making Fiberglas plastic covers for their machine tools," Al explained, "and they wanted me to discover for myself just how tough those covers could be. They handed me a sledge hammer and invited me to smash a cover about as large as a washing machine. It was like trying to crack a coconut with a spoon. Why, I was all out of breath, and getting nowhere."

Substantially, he *was* out of breath —but not from swinging the sledge. The previous evening he had attended a dinner meeting sponsored by the University of Wisconsin Engineering Institutes. In his capacity as guest speaker, he had delivered an address on "What's New in Metals." When he tried to dent some Gisholt production only a few hours later, he was still winded.

Incidentally, "What Plastic Covers Can Do for Machine Tools" will appear in the Jan. 16 issue of STEEL. When you read it, think of Al swinging his sledge hammer—preliminaries, you might say, to hammering out a story.

Hot Coins

How do you like artist Tom Bryan's cover about engineers' pay? Not too long ago a cover like that would have put Tom, Art Director Bill Kellogg and Editor Irwin Such in jail. Uncle Whiskers was incredibly fussy about unauthorized reproductions of any type of legal tender. Persons who copied coins, stamps, governmental seals, coins or bills automatically incurred the displeasure of the treasury, and more often than not repented their talents in a federal cell. Those silver dollars that Tom so carefully retouched and arranged on the cover conceivably could be clipped and passed in remote sections. Fortunately for all concerned herein, restrictions regulating the pictorial reproduction of coins have been relaxed. A universal affection for the models still exists, particularly among engineers who complain they aren't getting their share. The story on page 29 examines their claims.

Boll Weevils Baffle Briton

One of Britain's contributions to metalworking, Associate Editor Mike Webster, departed from his contemplation of things industrial last week to consider the boll weevil situation. Crashing into our coop with the air of a man who has just stumbled onto a great truth, he waved a release from the U. S. Department of Agriculture and declared that state and federal entomologists have estimated that 11,398 boll weevils will hibernate in each acre of Florence County, S. C., this winter.

"Three glossy, 8 x 10 photographs showing boll-weevil survey methods may be obtained free of charge," said Mike. "You simply get in touch with the Photographic Section, Office of Information, U. S. Department of Agriculture, Washington 25, D. C."

Although we caught our breath at the revelation, and confessed that the hibernation habits of the boll weevil was a subject close to our heart, we questioned the value of the photos.

"Why send for them, anyway?"

"Why?" Mike repeated. "They're free; that's why!"

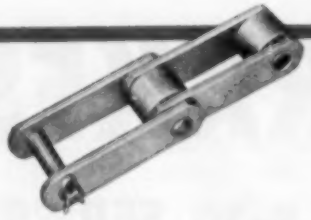
Miller's Meld

Miller the driller has been popping up all over after he bored through the earth from a mountain in New Zealand. However, if he went straight through, his antipodal exit would have been a spot in Portugal, about 60 miles or so east of Oporto. Miller, by the way, had three sons, Horatio, Ambrose and Androcoles, who played football. When they lined up in that order, from left to right, their numerals made a number that was the sum of 17 times Horatio's numeral, 34 times Ambrose's numeral and 51 times Androcoles' numeral. What number did each Miller boy wear?

Shrdlu

(Metalworking Outlook—Page 23)

For longer chain life, here's
less bushing and joint wear



Large-diameter rollers of Link-Belt SS chains reduce chain-pull due to frictional resistance.

Link-Belt Class SS roller chain assures steady, even flow of fabricated products from medium-temperature industrial oven manufactured by The W. W. Sly Manufacturing Co., Cleveland, Ohio. Link-Belt precision steel roller chain and roller bearing blocks are also used.

LINK-BELT SS roller chains are designed for abrasive, heavy-duty service

FOR hard-working drives and conveyors, choose Link-Belt SS bushed roller chain. Its hardened steel joint assures longer life in gritty and abrasive applications. Accurately machined parts provide a firm, tight fit of pins and bushings in the steel sidebars. In addition, accurate control of raw material specifications and manufacturing processes results in uniformity . . . longer life.

Whatever your particular chain requirements in regard to speed, weight of loads or severity of service—the completeness of the Link-Belt line will provide the right answer. No other manufacturer offers such a broad range of silent and roller chains—of cast, combination, forged and fabricated types. And a complete selection of attachments permits efficient adaptation to varied services.

For help with any chain problem—big or small—call your local Link-Belt office or authorized stock-carrying distributor. He is qualified to make an unbiased recommendation of the one chain best-suited to your exact needs.

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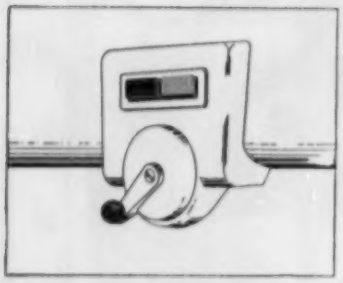
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13.000

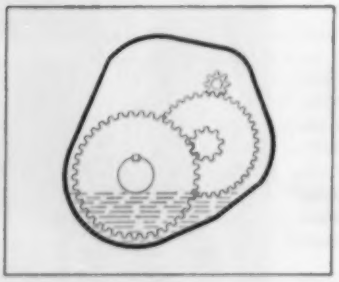
2 New CINCINNATI PRESS BRAKES

THIRTY TON - - - - 2-30 SERIES
FIFTY TON - - - - 3-50 SERIES

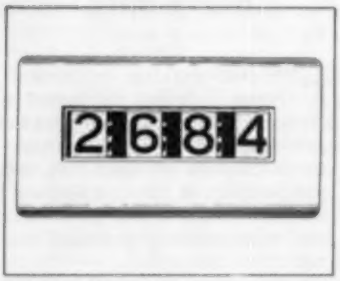
COMPETITIVELY PRICED



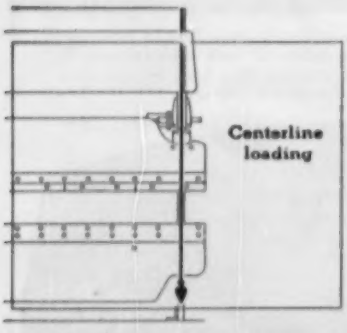
Front controlled, variable speed drive, 20 to 80 strokes per minute.



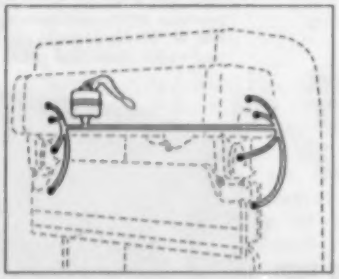
Completely enclosed transmission, running in oil.



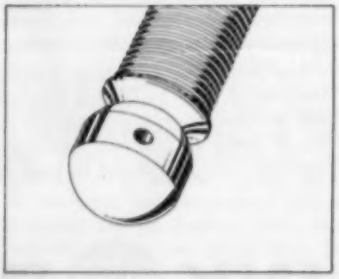
Two micrometer indicators, one at each end of the ram—easy to read and accurately record the amount of adjustment and tilt.



Centerline loading prevents weaving of the housings and insures accurate bends.



Centralized pressure lubrication system.



Ball end on the ram adjusting screws permits tapering of the ram for fade-out work.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

2-30 SERIES

This new 2-30 Series Cincinnati All Steel Press Brake has a capacity of 14 gauge x 6′ mild steel.

Look at these unusual standard features:

2½″ stroke—12″ shut height—9″ throat.

Distance between housings 5′-2″—overall die surface, 6′-0″.

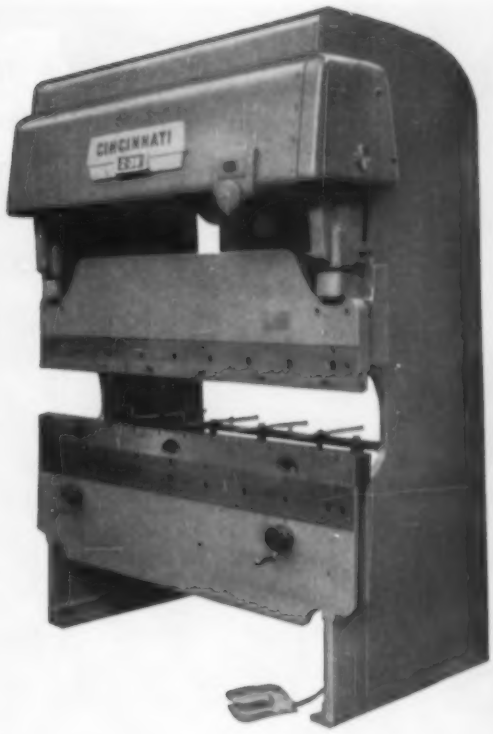
Front controlled, variable speed drive, 20 to 50 SPM. 4″ manual ram adjustment including ram tapering adjustment for fade-out work (power adjustment available as extra feature).

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



3-50 SERIES

These new 3-50 Series Cincinnati All Steel Press Brakes are built in two lengths and have a capacity of 10 gauge x 6′ mild steel. Investigate these unusual standard features: 3″ stroke—12″ shut height—12″ throat—distance between housings 6′-6″ or 10′-6″—overall die surface 8′-0″ or 12′-0″—front controlled, variable speed drive, 20 to 50 SPM.

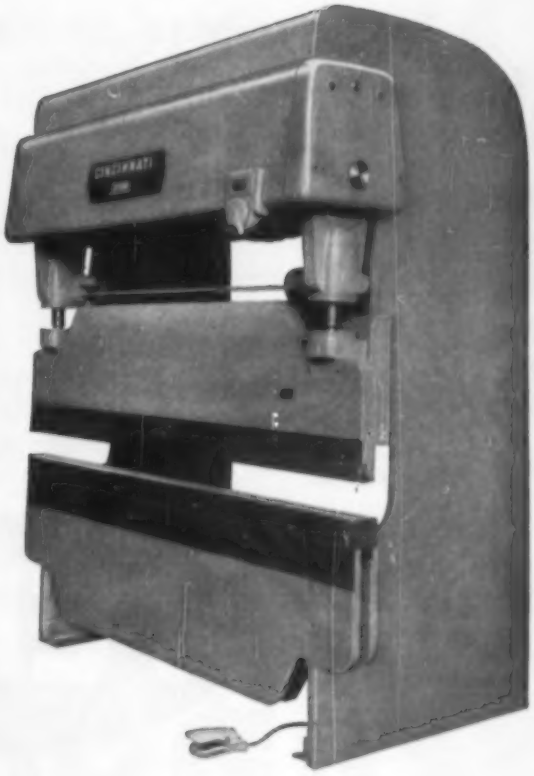
5″ motorized ram adjustment, including ram motor and control, complete with ram tapering adjustment for fade-out work.

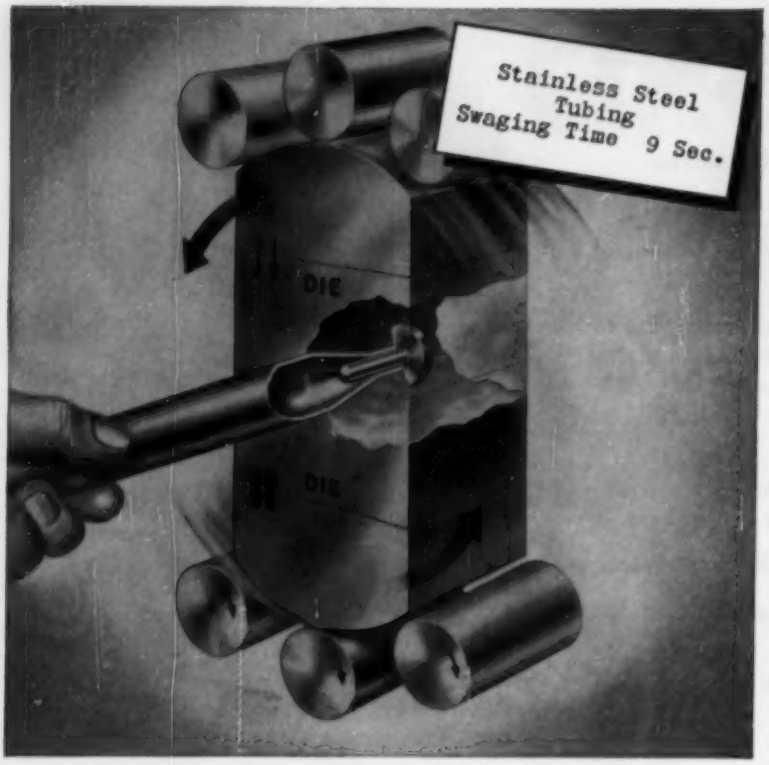
Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.





You save several machining and finishing operations with rotary swaging

You also save time, material and labor costs . . . greatly increase output . . . in a variety of pointing, tapering, reducing, sizing, forming and assembly operations.

SOME SWAGING EXAMPLES

Check with Fenn for engineering advice on swaging your product or parts.

FENN

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The Fenn Manufacturing Company, 556 Fenn Road, Newington, Connecticut

LETTERS
TO THE EDITORS

Engineer Still Learning

Your articles on materials, such as leaded steels and various irons, have been interesting and educational to those of us who feel that we have never learned all. I have made that clear to the engineers, tool engineers and master mechanics whom I have called on during the 36 years of my 54 years with my company.

I appreciate the opportunity to continue to learn. It is a "must" these days. With the continued developments, one must be alert and stay advanced. I for one appreciate your articles 100 per cent.

John G. Green
Chief Service Engineer
Standard Tool Co.
3960 Chester Avenue
Cleveland 14, O.

Close to Home

I would appreciate two copies of the article, "Why the Forging Failed" (Nov. 21, page 96). It was particularly interesting to me because we have two identical units here at the St. Clair Power Plant.

Don Coddington
Shift Operating Foreman
St. Clair Power Plant
St. Clair, Mich.

Regions for Steel Markets?

Steel producing regions are generally listed as the East, Pittsburgh-Youngstown, Lake Erie (Cleveland-Detroit), Chicago, South and West. We are unable to obtain information on the geographic marketing limits of these regions. Can you help us?

Anthony A. Pack
Assistant to the President
Hyster Co.
Portland, Ore.

• *We know of no clearly defined lines of demarcation. There are several reasons:*

1. Steel producing regions are set up on the basis of ingot production, not output of finished products—bars, plates, shapes, sheets, etc.—the forms in which 95 per cent of steel products are marketed.

2. The market area limits of mills are determined by the distance they can ship (rail, truck, water) before coming into competition with shipments from other producing regions. Freight rates make for a crazy-quilt market pattern. They are anything but uniform and are subject to sudden changes and exceptions.

3. Since all mills do not produce all products, the market limits of any spe-

(Please turn to page 12)

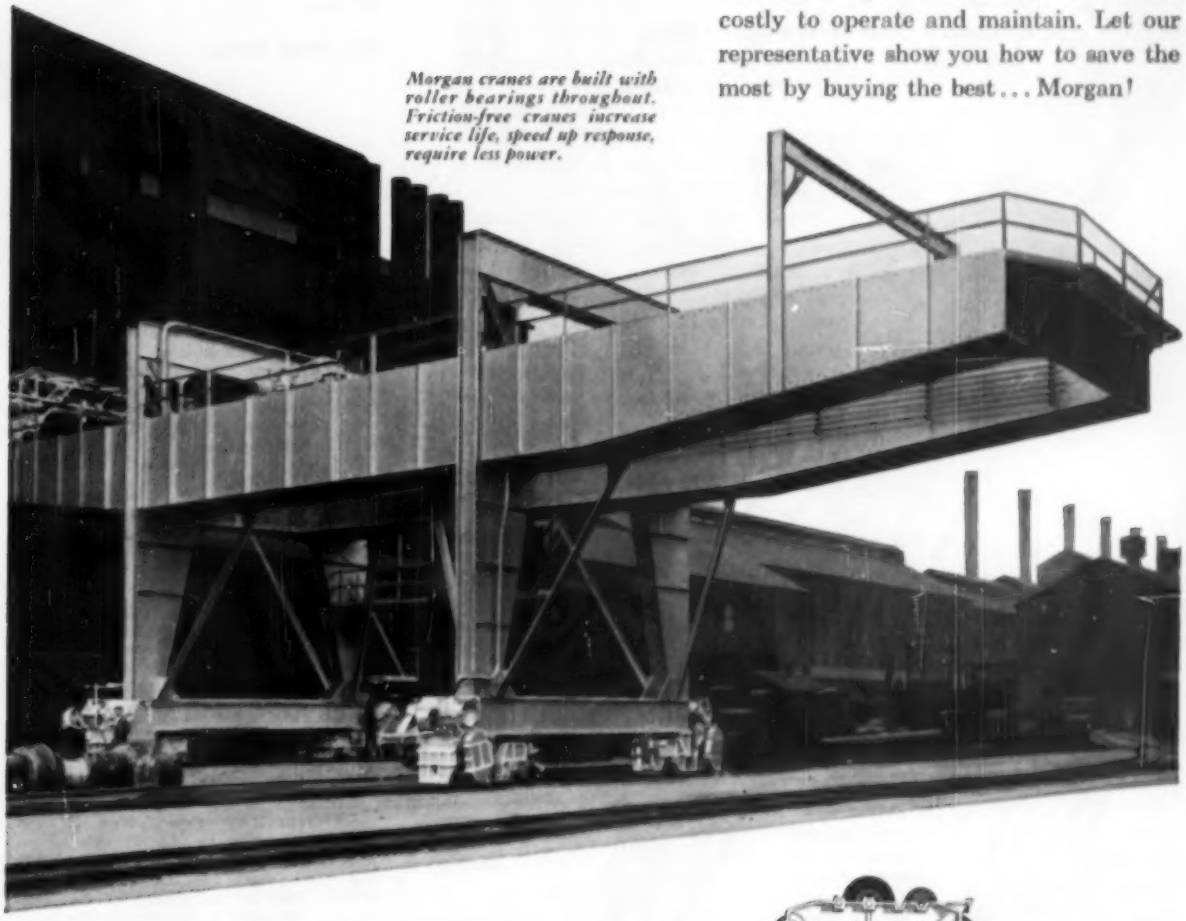
How Morgan keeps cranes "rolling"

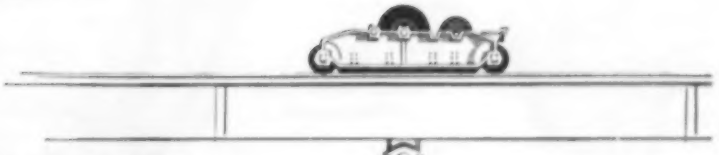
• MORGAN "Anti-Friction Engineering" keeps cranes rolling by providing precisely correct bearings and mountings for each specific application . . . your assurance of longer trouble-free operation, lower maintenance costs.

"Anti-Friction Engineering" is another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best... Morgan!

Morgan cranes are built with roller bearings throughout. Friction-free cranes increase service life, speed up response, require less power.





The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

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ACCO's Great New Chain...

ACCOLOY X-WELD 125

• *At last*—a chain with welds as strong or stronger than the material ... welds made with two projecting lugs that absolutely prevent dangerous kinking of the chain ... welds that provide 2¼ times the welded area found in normal flash or butt-welded links. **Accoloy X-Weld 125** Chains hang straight as a die. Every link is perfectly formed!

Accoloy X-Weld 125 Chain has almost countless uses: Slings, bundling, towing, general utility chains ... It can be furnished in special analyses and heat treatments to provide greatly extended life and use on tough jobs ... corrosive jobs ... abrasive jobs ... hot jobs. Specify **Accoloy X-Weld 125** for your next chain job for a new concept of chain performance, economy and value. Available in ¼", ⅜", ½", ⅝" and ¾" sizes.

• *Ask our nearest district office for further information on* ACCOLOY X-WELD 125 CHAIN, *or write the American Chain Division, York, Pa., for descriptive bulletin.*

PATENT APPLIED FOR

The Secret is in the Weld!

This Accoloy X-Weld 125 link was ground and etched to show its big welded area —2¼ times the size of welded area possible with other welding processes. This means more than double the security at the weld—and only X-Weld has it!

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for Better Value

LETTERS

(Concluded from page 10)

citic mill would vary with each product it produces.

For instance, a mill turning out a variety of products might have a greater market area in sheets than in bars. For that reason, its competition in sheets is more distant than in bars.

4. Mills favored with water routes can meet competition from plants which are located geographically much closer to the point of consumption.

To make up a market map for the various steel producing regions, the market position of each producer on each product in each district would have to be analyzed. If you could obtain these data from the separate mills, you could come up with a fairly intelligible market map.

Ore from India

It would be of great assistance to us (for we are a newly established firm) to obtain a listing of steel producers utilizing manganese ore. We are able to import high grade Indian manganese ore in large quantities. We are in contact with two firms now, but I feel certain there are other producers which may use manganese.

William A. Morrison
William A. Morrison & Co.
Danbury, Conn.

• *Every primary producer of steel uses manganese as a deoxidizing and desulphurizing agent in the manufacture of steel. It also is used in various manganese alloys. For names of steel companies and ferroalloy producers, see Thomas'* Directory of American Manufacturers *or the steel directory, published by the American Iron & Steel Institute, Empire State Bldg., New York City.*

Aluminum Printing Plate

The item, "Photo Metal," in the Technical Outlook column of Nov. 28 was of great interest to us. It tells of an anodized aluminum photographic printing plate used for name plates, etc. Please give us the source of this material. We want to investigate the process further.

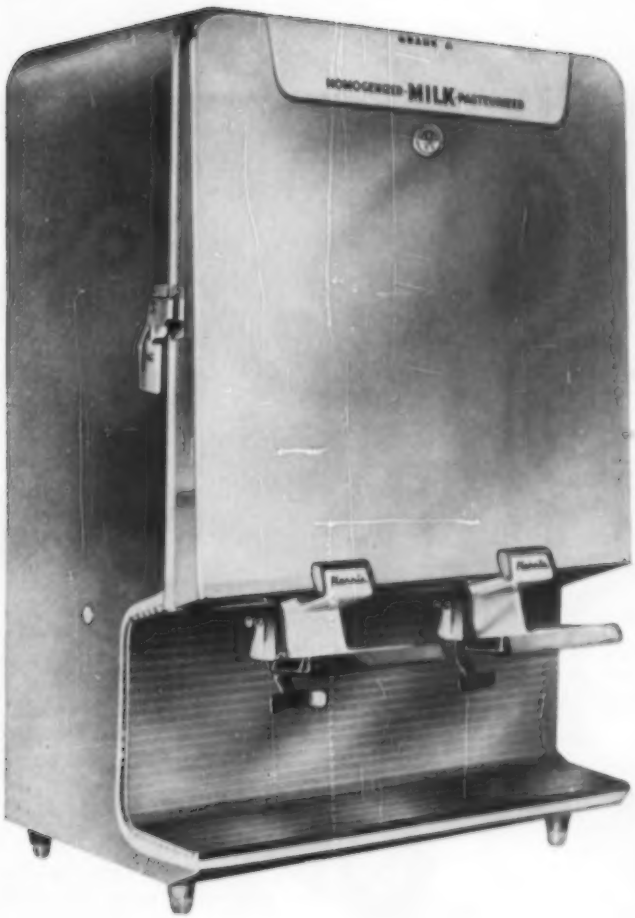
Ray S. Neidigh
Research Engineer
Elgin National Watch Co.
Elgin, Ill.

• *Contact Metalphoto Corp., 2903 E. 79th St., Cleveland 4, O.*

No Short Circuit Here

Your article, "Printed Circuit Industry Expands" (Dec. 5, page 148), is exceptional. I would appreciate three copies.

Arthur Durage
Allen B. Du Mont Laboratories Inc.
East Paterson, N. J.



this attractive new dispenser of STAINLESS STEEL

meets every standard for cleanliness and top design

The Norristocrat is the newest addition to the line of milk dispensers manufactured by Norris Dispensers, Inc., of Minneapolis, Minnesota. It's designed by Raymond Loewy Associates and, like many Norris dispensers, it's Crucible stainless steel *inside and out.*

INSIDE, it's stainless to keep milk dairy-fresh, with flavor unchanged . . . to make cleaning easier . . . to meet all sanitary codes . . . and to satisfy the most exacting demands of schools and hospitals across the nation.

OUTSIDE, it's stainless to insure an attractive, lasting appearance that complements its clean, modern design . . . and adds to its promotional effectiveness for encouraging the consumption of milk.

Cleanability, product protection and bright good looks are the main reasons Norris insists on stainless steel. But stainless offers many other properties, too — among them corrosion and heat resistance, high tensile strength, excellent workability. And you'll find exactly the combination and degree of these properties you need in one of the thirty grades of Crucible stainless steel. To see what general and technical literature is available to help you make the most of Crucible stainless — *or* any other Crucible special purpose steel — write for your free copy of the Crucible Publication Catalog. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

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THE RIGHT SLANT. Her fashionable hat keeps its perky tilt, thanks to CF&I-Wickwire Hat Wire in the brim.

"NEITHER SNOW..." When the going's rough, drivers are thankful for tough, strong tire chains made of CF&I-Wickwire Chain Wire.

from holding smart hats in shape... to holding cars and trucks on snowy roads, nothing does the job like wire!

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CF&I-Wickwire Wire is made in plants conveniently located from coast to coast. For detailed information, write our nearest district sales office.

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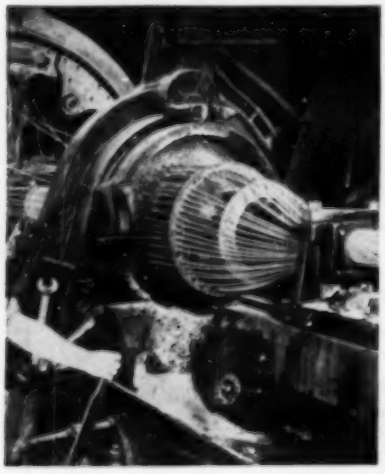
IT'S CHILD'S PLAY to open today's sardine tins. Their sturdy key openers are made of CF&I-Wickwire Can Key Wire.

ALL WOUND UP. Here a submarine cable is being sheathed in CF&I-Wickwire Armor Wire for protection and resistance to mechanical failure.



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CF&I

But why MEN over 45?

Our doctors still don't know *why*, but if you are a man over 45 you are six times as likely to develop lung cancer as a man of your age twenty years ago. They *do* know, however, that their chances of saving your life could be about *ten times* greater if they could only detect cancer long before you yourself notice any symptom. (Only 1 in every 20 lung cancers is being cured today, largely because most cases progress too far before detected.)

That's why we urge that you make a habit of having your chest X-rayed every six months, no matter how well you may *feel*. The alarming increase of lung cancer in men over 45 more than justifies such precautions. Far too many men die *needlessly!*

Our new film "The Warning Shadow" will tell you what every man should know about lung cancer. To find where and when you can see this film, and to get life-saving facts about other forms of cancer, phone the American Cancer Society office nearest you or simply write to "Cancer"—in care of your local Post Office.

American Cancer Society

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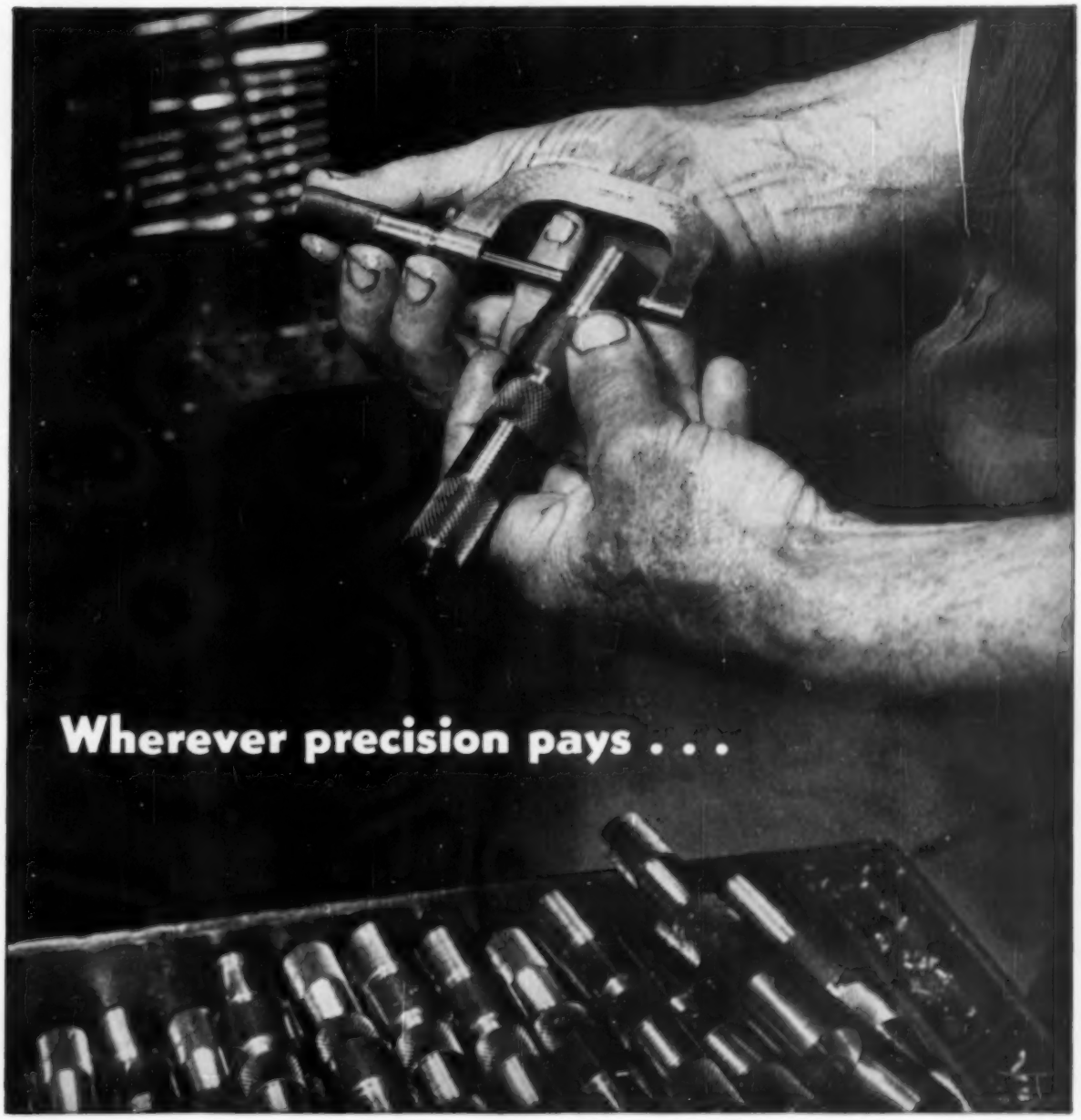

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It was our original intention to restrict the application of this press to certain specialized industrial fields, but it is now apparent that it has the broadest possible application and the pressure to release general information regarding its performance has been overwhelming.

We, therefore, use this open letter as an invitation to authorized personnel to see this machine in operation.

If you will express your desire in letter form on company stationery, it will receive our prompt attention.

Very truly yours,

WEAN EQUIPMENT CORPORATION

R. J. Wean, Jr.

R. J. Wean, Jr.
President

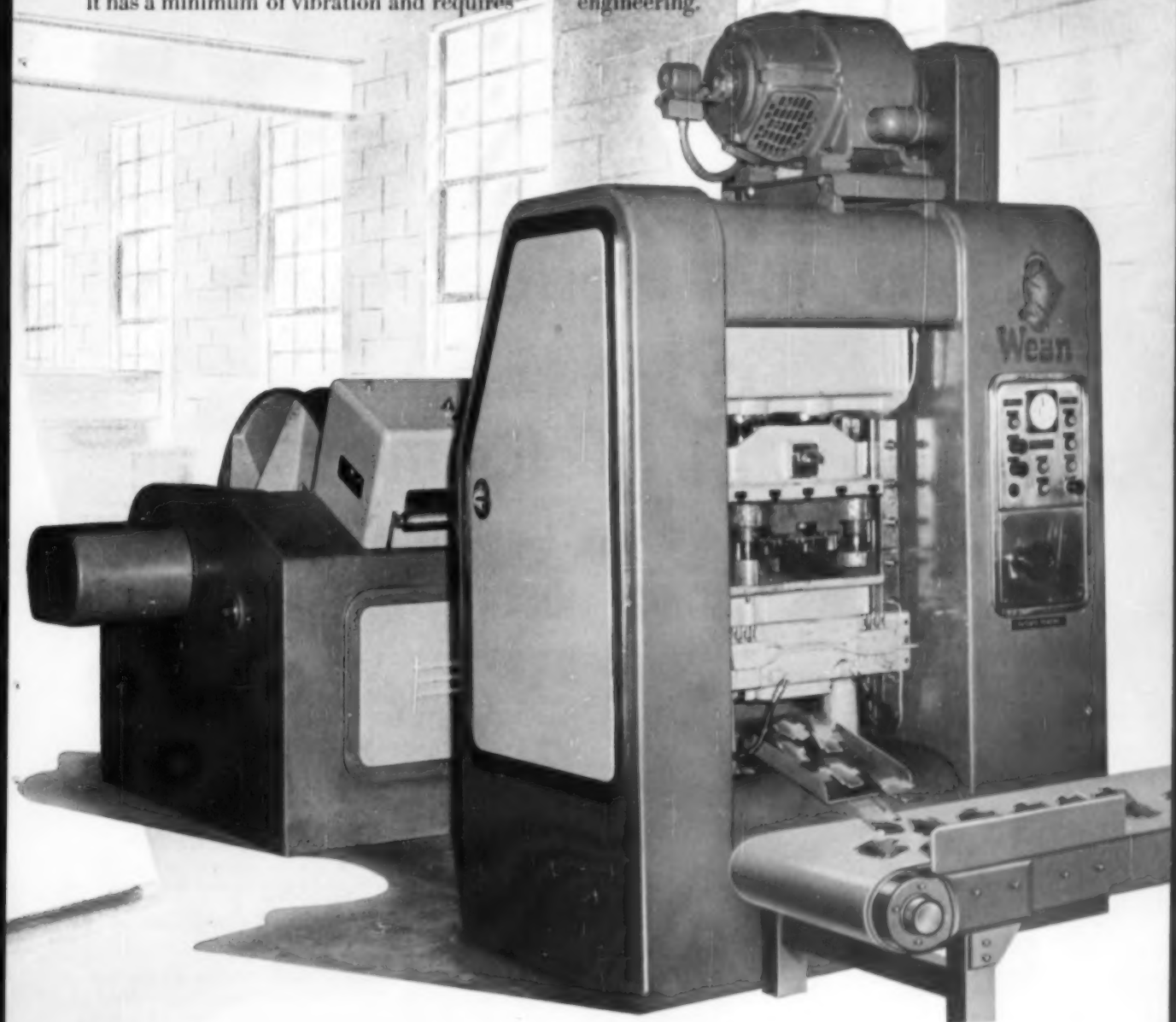
Wean

FLYING PRESS

Designed primarily for speed of operation, the Wean Flying Press is the first machine of its kind to successfully combine the fast operating advantages of continuously fed strip with dies which move with the strip.

The press differs greatly from conventional machines. Machine tool-like in appearance, it has a minimum of vibration and requires no foundation. In addition to its great speed, it incorporates several new design principles that should interest every press user.

An automatic adjustment of feed length while press is in motion, and the absence of a clutch and brake (the most frequent points of maintenance on conventional presses), are two examples of this advanced engineering.



Wean 60-ton Flying Press stamping out automotive hinge plates at 600 pieces-per-minute, using the same die set which on a conventional press made the parts at a rate of but 90 pieces-per-minute.

Wean EQUIPMENT CORPORATION Cleveland, Ohio

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Unusually tough, even at sub-zero temperatures, Lukens "T-1" steel can reduce equipment costs.

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Equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Lukens "T-1" steel can be fabricated not only in the shop but also in the field, through proper design procedures. Because of its high yield strength (over 90,000 psi) this new steel offers lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. And Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for equipment builders through the use of wider plates that require fewer welded seams.

The latest addition to Lukens' complete line of carbon, alloy and clad steels, this quenched and tempered alloy plate steel's unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write to: Manager, Marketing Service, 773 Lukens Building, Lukens Steel Company, Coatesville, Pa.

LUKENS "T-1" STEEL

To get the new, 28-page book on Lukens "T-1" steel, ask for Bulletin 781.

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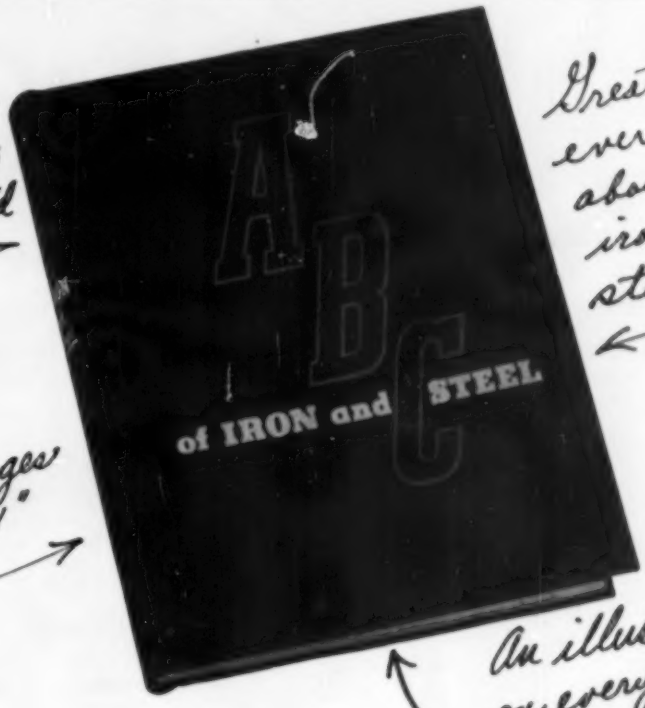

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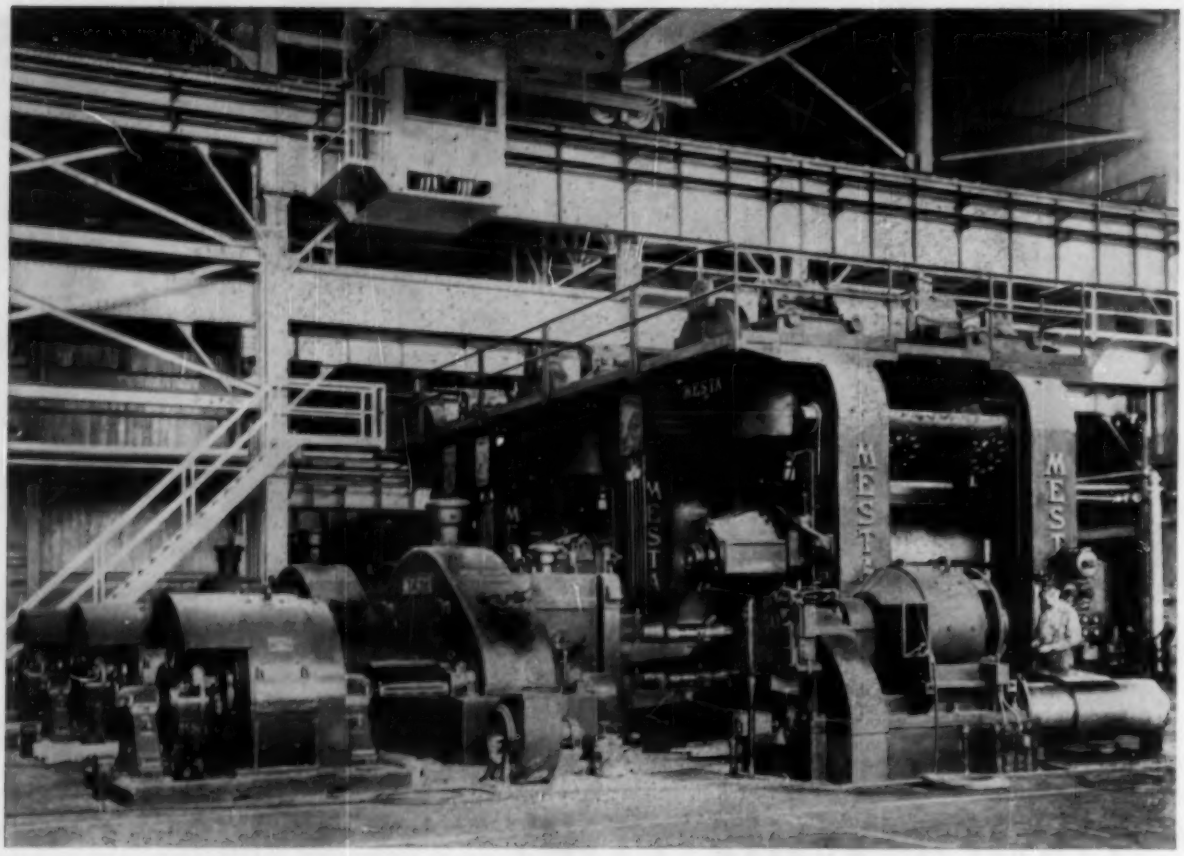

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3) Great stability: *Texaco Meropa Lubricant* will not separate in use, storage or centrifuging.

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The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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Metalworking Outlook

About-Face for McDonald

Management men close to the steel labor situation are becoming more alarmed about strike possibilities next July. Steelworker President David McDonald, once noted for his cordial relations with steel executives, has become antagonistic. Probable reason behind the change: Mr. McDonald is thoroughly alarmed at unrest in his union. In elections for union officers this fall, important candidates that he backed won, but just barely. His opponents criticize him for being too conciliatory. He's evidently embarking on a policy to squelch such complaints.

Drive for Union Members

Look for heavy campaigns to boost AFL-CIO membership, especially in smaller towns in the Midwest and throughout the rapidly industrializing South. Jumping the gun on new organizing drives is a Teamsters & Butchers Joint Organizing Committee. More such campaigns will come, particularly in metalworking.

Big Business in Labor

One hundred ninety-four labor unions in the U.S. and Canada collect a minimum of $457 million a year in dues, according to a National Industrial Conference Board study. Of that amount, about $228 million is turned over to international or national headquarters in per capita taxes, while the remainder stays in local treasuries. Initiation fees vary from 65 cents to $250, with the highest in the maritime and craft unions. The groups surveyed represent 98 per cent of total national and international union membership in the U.S. and 75 per cent of unionized labor in Canada.

Prefab Homes: More in '56

Some 120,000 factory-made homes will be produced in 1956, predicts the Prefabricated Home Manufacturers' Institute. That comes despite predictions for declines in over-all nonfarm housing starts during the year (see page 34). In 1955, prefab shipments will hit nearly 100,000, compared with the previous record of 77,000 units sold in 1954.

Quiet Industry

Next year will be a quieter time for building, literally but not in a business sense. The Acoustical Materials Association forecasts that use of sound-deadening materials will jump 25 per cent in 1956 over 1955, to about 400 million sq ft. The group bases its prediction "on the growing architectural acceptance for prefabricated acoustical materials."

Mr. Vinson Complains

Rep. Carl Vinson (Dem., Ga.) wants to know why the military isn't buying more on open, competitive bidding instead of negotiated contracts. He

says enough money could be saved by competitive bidding to almost balance the budget. The Pentagon is studying the charge. It's probably the opening shot in a Democratic offensive aimed at administration spending policies.

New Planning Studies at the Pentagon

Materiel planning studies will be made by the Army, Navy and Air Force for selected items on a regular basis. That's the gist of a new directive issued by Assistant Defense Secretary Thomas P. Pike. One thing Mr. Pike wants is a departmental interchange of requirements and production data for those principal items under co-ordinated procurement.

Another Car for Ford

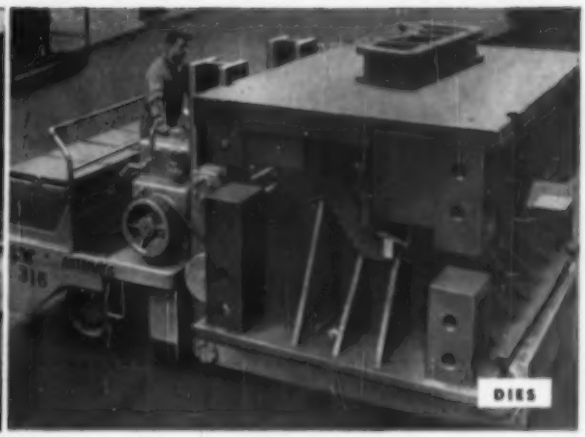
Ford Motor Co. will introduce a new line of passenger cars. It makes no details public. You can expect the car to be competitive in price with Pontiac and Dodge. Tentative name: Edsel. The introduction date is still uncertain. The bare announcement came last week in connection with Ford's registration statement covering the proposed offering of 10.2 million shares of its common stock. The statement reveals that sales for nine months ending Sept. 30 totaled $4 billion. Net income was $312.2 million. For the first nine months this year, Ford had an average of 178,595 employees. Wages and salaries during that period were about $819.9 million.

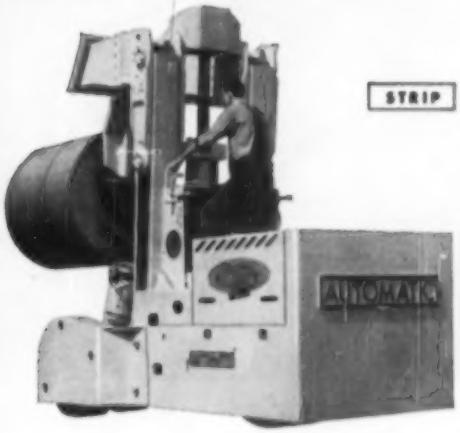
Coming: Higher Freight Rates

The Class I railroads want a flat 7-per-cent increase in freight rates. Odds are they'll get it, by Jan. 3 or 4 at the latest. The request to the Interstate Commerce Commission for the hike followed recommendation by a Presidential fact finding board that some 750,000 nonoperating employees be granted wage increases of 16.5 cents an hour. Don't confuse this increase with the one eastern roads want for short-haul steel (see page 35).

Straws in the Wind

Water shortages in Quebec will curtail Aluminum Co. of Canada's aluminum production next year by 10 per cent . . . Of all the rubber the U.S. consumes in 1956, 62 per cent will be man made, says B. F. Goodrich Co. . . . The Air Force has awarded Ford a $265.8-million contract to boost production of the J-57 engine . . . Allison Engine Division of General Motors Corp., Nuclear Development Corp. of America, Aircraft Jet Turbine Division of General Electric Co. and AiResearch Division of Garrett Corp. are making studies of a nuclear power plant for seaplanes . . . GE's Foundry department will establish a $750,000 applied research and development lab at Schenectady, N. Y., to improve foundry processes and products.





Automatic Trucks Handle Everything in Steel

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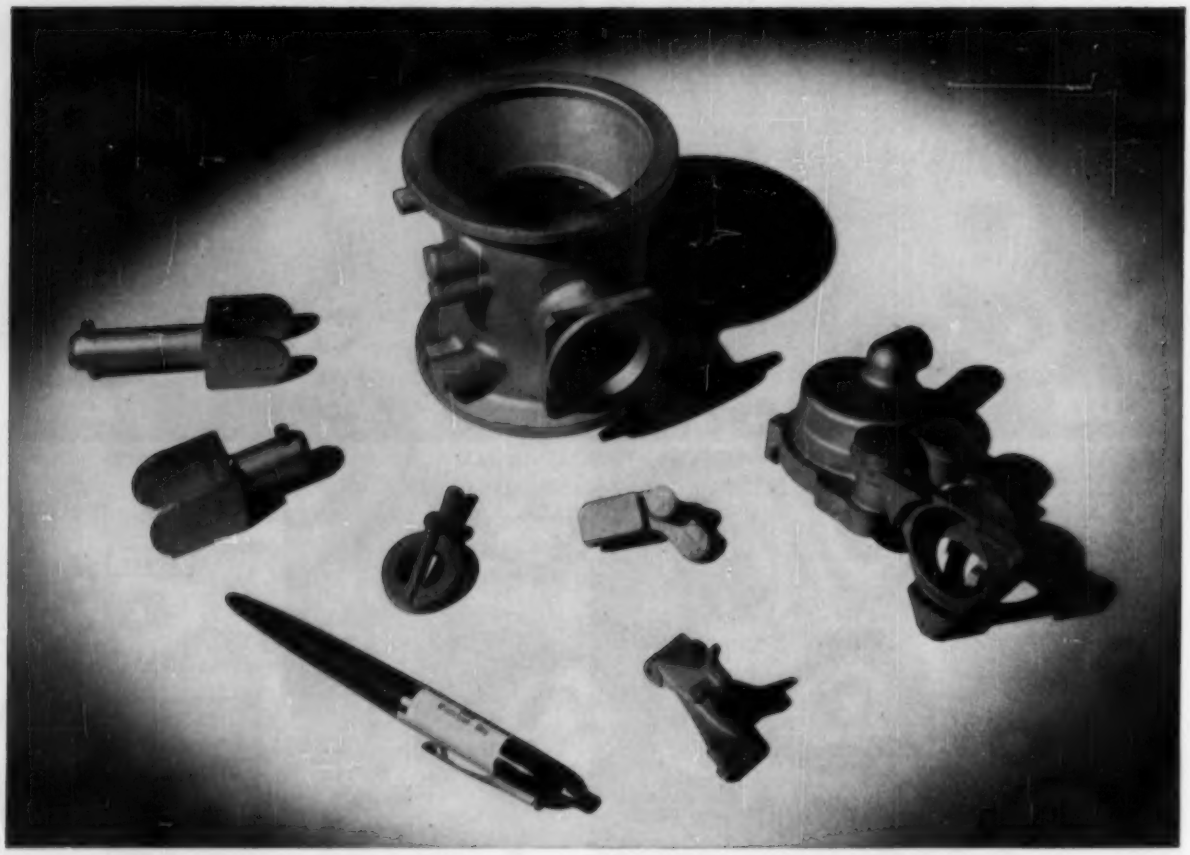

Stainless castings show up to 190,000 psi strength after 875 F hardening treatment

Foundries report ultimate tensile strength as high as 190,000 psi in investment castings of Armco 17-4 PH Stainless Steel. This precipitation-hardening grade is easy to cast. It fills thin sections and details nicely, surface finish is good and tolerances small.

READILY MACHINABLE Armco 17-4 PH investment castings machine readily to an excellent surface finish. The subsequent 1-hour hardening treatment at 875 degrees F will not distort the part nor damage the surface. It causes only a slight discoloration.

NUMEROUS SUPPLIERS Armco does not make castings. If you are interested in high-strength, low-temperature hardening castings with high corrosion resistance, just fill out the coupon. We'll send you a list of suppliers of investment castings and other types made of Armco 17-4 PH Stainless Steel.

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SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • ARMCO INTERNATIONAL CORPORATION

Needed: 27 Fairless Works

The steel industry is winding up 1955 with a blazing production record of 117.2 million tons of ingots. It's a third more than the production of 1954 or 1944, double that of 1929 and eight times that of 1932.

As 1956 unfolds, the industry will be working off an unprecedented backlog of unfilled orders. Faltering automobile production is causing scarcely a ripple in mill rolling schedules. Other customers are standing eagerly in line. Even if auto sales drop a million units, the 7 million produced still will be the second highest on record. Filling any conceivable gaps in demand are heavy steel products like structurals, plates and pipe needed for the expanding construction, railroad car and oil programs. Over-all metalworking activity in 1956 promises to be 8 per cent better than it has been this year.

Steel management's worry now is whether more capacity can be added fast enough to care for expanding demand.

Through increased use of sinter, blast furnaces capacities are being increased as much as 20 per cent. The newest blast furnace has a 30-foot hearth. A new method for building steelmaking furnaces on the open-hearth floor and rolling them quickly into place promises to save costly down time. Existing open hearths are being enlarged, and melting time is being speeded up through better practice and use of oxygen.

Most electric furnaces have been converted to faster charging. Big, new, electric furnaces have 20-foot hearths and capacities of a couple of hundred tons.

New methods, such as the oxygen-converter vacuum melting and vacuum pouring, are beginning to move in.

These expansions, additions and improvements in technology have brought steel capacity up to an estimated 128 million tons. But that's not enough.

To satisfy anticipated demand for steel products over the next 15 years, it will take the equivalent of 27 Fairless Works—each with a capacity of 2.2 million tons, each at a cost of $660 million.

It necessitates judicious industry planning on where to build what kind of capacity. The goal: Nearly 60 million more tons. The cost: $18 billion.

Irwin H. Such
EDITOR

call Ryerson for steel

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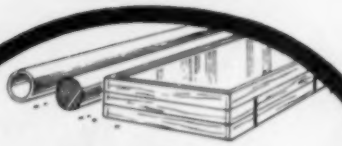

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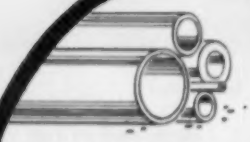
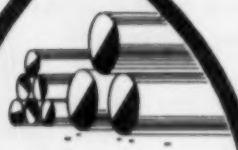


TUBING

Mechanical and pump cylinder tubing, seamless and welded; hydraulic fluid line and boiler tubes; structural tubing, etc.



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Why Engineers Quit

A west coast firm queried 96 who terminated in a year. Here's what they said; most had several reasons for leaving.

REASON	PERCENTAGE
Loss of key personnel	10.9
Ineffective administration	10.9
Lack of research contracts	10.0
Low morale of associates	7.9
Broaden experience	5.9
Talents not utilized	5.4
Lack of recognition	5.0
Growing emphasis on production	5.0
Desire for more responsibility	4.6
Seeks higher salary	4.6
Joining former associates	4.2
Desires smaller company	4.2
Lack of opportunity for advancement	4.2
Work too routine	3.4
Personality clash	3.4
Family problems	2.5
Entering military service	2.1
Dislikes personnel evaluation methods	1.7
Uncertain future of the company	1.3
Commuting distance too far	0.8
Resuming formal education	0.8
Working conditions too crowded	0.8
Entering own business	0.4

Unrest Among Engineers

The scarcity of technical men is at the root of the problem, as jobhopping reaches all-time high. Here are some tips on how to hold your men

NEXT MONTH John Smith starts the sixth job in his eight-year career as a mechanical engineer.

Jobhopper Smith tells himself this is a smart move because it brings him to $580 a month—$50 higher than the average pay for mechanicals with his experience. He knows that $530 is the average because he saw a survey of engineering salaries made by major employers in his town.

Cause and Effect — The root of the situation that permits a man like Smith to take six jobs in eight years is the shortage of engineers. But that shortage is breeding some side defects that promise to become as serious as the basic shortage. The scarcity is bringing unfortunate administrative habits in some managements, particularly in salary controls. It's accentuating prima donna qualities in some engineers who are taking undue advantage of being on the lucky side of a sellers' market.

There'll be no relief to the engineering shortage until at least 1960. Our fantastic technological growth demands new engineers at an unprecedented rate—35,000 to 50,000 a year. The low birth rates of the 1930s result in a current slump in engineering enrollment—only about 24,000 engineers will graduate with bachelor degrees in 1956, compared with 22,600 in 1955

Interim Answer — What to do? Says E. L. Yates, director of college and university relations for General Motors Corp.: "We've got to wait out the shortage until the higher birth rates of the 1940s and the increasing attractions of engineering combine to bring us enough new engineers — which will probably be in the 1960s. In the meantime, we must provide the right climate that will hold and develop our technical men."

Are all companies providing the right climate? A glance at the want ads in any metropolitan newspaper will answer the question with "no." One observer estimates: "Any company that this year had turnover in its engineering personnel of 10 per cent or less is doing mighty well."

Reasons Why—Many had a much

higher ratio, including one which lost 175 this year. So concerned was it with the problem that it surveyed 96 of those who quit to find out why. Of the 23 reasons given (see accompanying list), inadequate salary ranks only ninth. GM finds salary ranking near the bottom of the half dozen reasons listed most frequently for quitting.

That's surprising. To hear engineers talk, you would think salary is the big bugaboo. The complaint a '51 graduate of Case Institute of Technology: "When I graduated four years ago, I got $298 a month. Today, I'm earning $463. Another Case man joined us this year from the class of 1955. He's getting $384. I'm not begrudging him his money, but I've had four years of experience here, and I'm getting only $79 a month more than he is."

Pattern — Case '51 knows so much about the starting salary of Case '55 because the competition for young graduates has made beginning scales fairly standard. For example, Case's director of placement, Arthur E. Bach, calculates that average starting salaries for men with bachelor degrees have jumped from $298 in 1951 to $400 in 1956. (see chart below.)

Industry is forced to pay that for starters, but it often doesn't make upward adjustments for its older engineers to keep the spread between the experienced and the inexperienced equal. The chart (on page 31) of a Midwestern survey of engineering rates by age shows that, on the average, a man of 35 is making only $200 more a month than a man of 23.

Complaint — No wonder engineers are restive, even though many a 35-year-old engineer is above average and is making far more than $585 a month. Many engineers (and some management men, too) criticize the present fad for engineering salary surveys. It tends to freeze the pay scale in the mythical "average" pattern. "Average" also tends to be on the low side. Although more and more companies are refusing to participate, enthusiasm for the survey is still strong. In one city, various companies in the area this year participated in at least five substantial checks.

Survey proponents argue: You've got to know what the competition is paying to hold engineers in these times. Opponents say: The survey puts too much emphasis on money, gives too many people the impression that money is the basic problem.

Management Problems — While money is important, other factors are even more common reasons why engineers quit, as indicated in the list on page 29. The most important: Ineffective administration, talents not utilized, lack of recognition.

Administration—GM's Mr. Yates believes ineffective administration of engineers usually stems from poorly trained or picked supervisors and from a failure to make the engineer feel he's part of the company's whole operation. In this age of specialization, the engineer is the prime victim. So rapid has been technological advance that no one man can hope to work on all phases. He has to become a specialist. He often feels sidetracked.

GM attempts to dissipate the "side-tracked" feeling through monthly or bimonthly meetings with its engineering groups. Purpose: To tell engineers the overall problems of business. Some meetings on a specific problem are run by the engineers themselves. Occasionally an outside scientist comes in to talk. Tours of other plants are arranged. And the men are encouraged to join professional societies. GM generally does not pay the dues, nor do most other companies.

Good supervisors, of course, are a must. GM has a school for them. Other companies are sending supervisory candidates to college for special courses.

Talent—"I'm asked to do detail work that any good high school graduate with conventional courses in mechanical drawing could do," complains one engineering graduate. His complaint about poor utilization of talent is legitimate. Mr. Yates believes that industry should employ more technicians to do chores many graduate engineers have to do. His suggested ratio: Two or three technicians for every engineer.

In another phase of talent utilization, industry is also woefully weak. Of an estimated 800 companies in Detroit that employ engineers, only 50 have training courses. So unusual is it for a company to urge graduate work for its engineers that United Aircraft Co. made headlines earlier this month when it persuaded Rensslaer Polytechnic Institute to set up an extension school at South Windsor, Conn., for the use of employees at United and other companies.

Many good training booklets and directives exist. One of the newest and best, "Detroit Industry Engineering Training Program," is available for $1 from Engineering Society of Detroit, 100 Farnsworth Ave., Detroit 2, Mich.

Recognition—A higher salary is the most practical form of recognition, but engineers indicate that they want other forms, too, and will often quit if they don't get them. A Chicago company nullified a threat to unionize its engineers when it granted them parking privileges, excused them from punching a time clock and permitted selected personnel to take time off to attend out-of-town professional society meetings.

But a more vital problem in recognition is what to do about the talented engineer who has no supervisory abilities. In some companies, a man can't get into the

Engineers Starting Salaries Rise

1951	$298	1954	373
1952	331	1955	384
1953	357	1956	400

Source: Case Institute of Technology, for men with bachelor degrees

Average Engineering Salaries by Age As Shown by One Survey

23	$385
24	395
25	400
26	420
27	450
28	475
29	490
30	510
31	530
32	545
33	560
34	575
35	585

annual salary bracket of five figures unless he's a supervisor. GM has set up a nonsupervisory research associate who has salary, prestige and rank of a department head. The Cleveland Electric Illuminating Co. created a system of specialists who are not supervisors but are related to them in salary and recognition.

In salary recognition, a company should review all engineers' salaries at least once a year, preferably every six months. A company like Reliance Electric & Engineering Co. has an assistant chief engineer, C. R. Sutherland, one of whose major responsibilities is salary administration. He and many many other experts believe in creating a promotional series. A man may get promoted and get a salary boost, but he still may have the same job and title.

Enter, the Engineer — If some managements have to clean house, some engineers do, too. The most frequently voiced complaints: They're too slow to adapt to the realities of business life; they want the privileges of a profession but they shun its responsibilities, such as advanced education; they are overly concerned with money.

Adapting — Today, there are about four engineers per each 1000 people. There were two in 1940 and 1.3 in 1920. In 1920, they usually worked alone or in small groups. Today, they rarely work alone, but are usually part of a team effort. In 35 years, things have changed radically for engineers, probably more than for any other segment of our society. No wonder they're having adjustment problems.

Technological advances make some engineers think technical knowledge alone will take them to the top. Some technical schools have thought that, too. More and more are beginning to teach English and other liberal arts because they have discovered engineers need more than a slide rule to get along.

Professionalism — About 17,000 practice engineering in the Cleveland area, but only some 13,000 are members of any professional society, estimates Don Cornish, executive director of the Cleveland Engineering Society. How are those 4000 nonmembers keeping pace with technical developments, not to mention the society members who are not? Can a man call himself a professional if he doesn't take advanced training?

Says Gerry E. Morse, industrial relations vice president for Minneapolis-Honeywell Regulator Co.: "The engineer cannot rely on simply absorbing technical developments without effort as a result of day-to-day exposure on the job."

Money—On the average, a young engineer today starts out at about $25 a month higher than a liberal arts or business administration graduate. At the end of five years that gap has disappeared. At the end of ten, the business ad or liberal arts man may hold an edge over the engineer, although that's hard to prove. But some engineers believe you can. They see John Smith from Turpentine Tech earning $7000 a year while Bill Jones from Business U is pulling down $12,000 as a salesman. And Smith has to tell Jones the difference between a rotor and a stator!

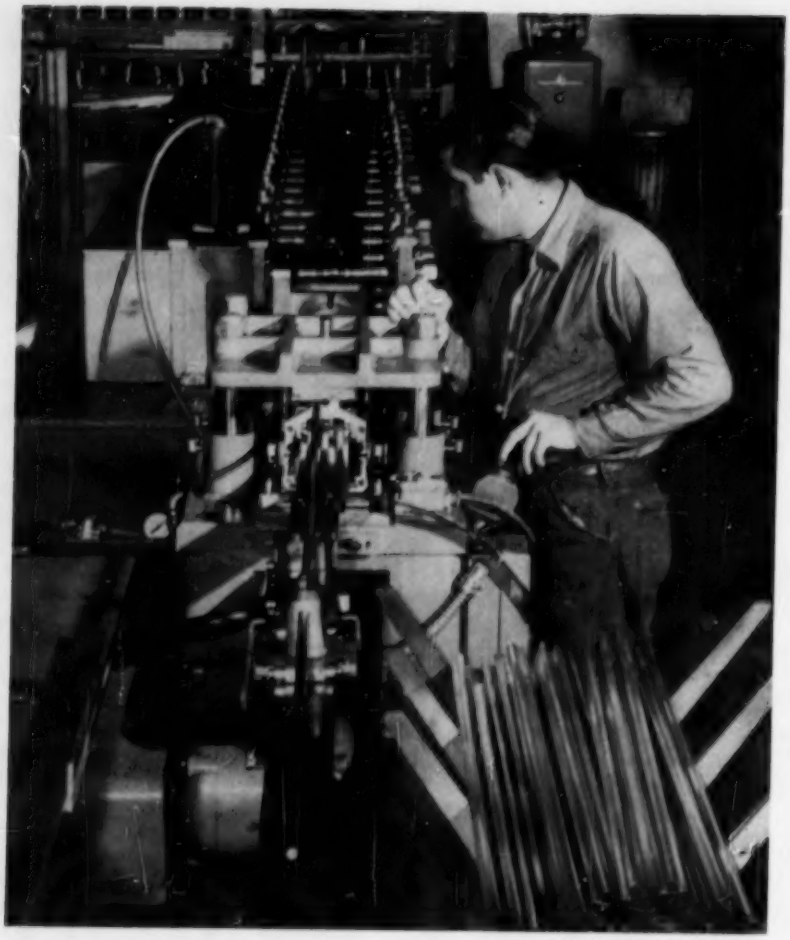
Engineers are usually most bitter about salary when they have been out of college five to ten years. "That's the dangerous age when they're most apt to quit," says Mrs. John A. LeBedoff, director of placement for Western Reserve University.

Crucial—But the time to catch an engineer to prevent him from becoming an embittered 28 is in the first five years of professional development. That's what the Engineers' Council for Professional Development believes. It started a test program in Cincinnati in 1952. So successful was it that it's now being started in Detroit. And Minneapolis plans to try it.

The program offers an opportunity for employers, colleges and engineering societies to co-operate in making a contribution to young engineers. The program involves the preparation of booklets and other aids to help in six areas: Orientation and training in industry; continued education; integration into the community (because many young engineers are new to the area); how to join professional societies and how to qualify for professional certification; how to improve self-appraisal; and selected reading.

Mr. Yates sums up: "We can live through this engineering shortage if we better utilize our technical men and provide opportunities for them to improve themselves."

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



Weatherstrip Research Institute

Insulating for air conditioning, plus winter sales, brings . . .

Weather Stripping Boom

IT'S A BIG YEAR for a little industry. The fifty-odd makers of metal weather stripping are tacking up sales that will beat the record year of 1950 by about 2 per cent.

The Weatherstrip Research Institute predicts sales next year will be equal to or better than this year's.

E. M. Rodenbaugh, president of National Metal Products Co., Pittsburgh, expects that next year will see a 5-per-cent decrease in sales to new construction. "However," he says, "the sales dip will be made up by modernization of old homes."

Recovery—In the first half of 1954, sales were more than 11 per cent below the similar period in 1953. But they increased every month in the last half, so that for the year they were up slightly over 1953's. The pace continues: First quarter sales this year were 31.1 per cent over 1954's first quarter.

Surprise—There is little seasonal variation in sales. The growth of air conditioning has made it important to insulate against heat as well as cold.

Not surprising is the heavy competition in the industry. Nonmetal weather stripping manufacturers are aggresive. Many firms make both metal and competing forms—felt, rubber, wood, plastic and fabric. But increased public demand for the most permanent material has boosted metal sales.

Metal Supply—An eastern manufacturer says: "We are in another cycle of shortages. This is about the third cycle of aluminum shortage since 1945, but we planned ahead for it and built our stocks. So the shortage hasn't hurt us, but it may have hurt other firms."

Something New—Master Metal Strip Service, Chicago, whose sales are up about 30 per cent this year, says a new aluminum and plastic stripping has made a big dent in the market this year. Plastic stripping is ringing up more sales in the variety stores. Sales of all branches of the industry have been helped by the do-it-yourself craze.

GE To Boost Spending

Ralph J. Cordiner, president, General Electric Co., predicts a 10-to-15-per-cent sales increase next year over 1955's record $3.1 billion. Mr. Cordiner also says that GE will spend $500 million for new facilities over the next three years.

The GE chief executive adds that the largest gain in sales this year has come in consumer products.

Kaiser Proposes Stock Merger

A merger plan for stockholders of Kaiser Motors Corp. and other Kaiser enterprises has been proposed by Henry J. Kaiser, chairman, and Edgar F. Kaiser, president of both Kaiser Motors and Henry J. Kaiser Co.

The plan calls for an exchange of stock which would make the Henry J. Kaiser Co. a wholly owned subsidiary of Kaiser Motors. The name would be changed to Kaiser Industries Corp.

Stockholders would be eligible to participate in such Kaiser enterprises as Kaiser Aluminum & Chemical Corp., Kaiser Steel Corp. and Permanente Cement Co.

Willys Motors would be a subsidiary of the new corporation and would be relieved of all present bank debts. Willys recently announced that it will no longer manufacture passenger cars, but will continue to make the Jeep and other utility vehicles.

Founders See Good Year

Nonferrous castings finish 12.5 per cent ahead of 1954. Metals shortages and high prices will still hold the industry in check in 1956

NONFERROUS FOUNDERS are finishing 1955 about 12.5 per cent ahead of last year. They expect to do as well or better next year, metal supply and price levels permitting.

Still Booming — For instance, there will be between 1.2 million and 1.3 million new homes started in 1956 (see page 34). Demand for copper plumbing goods will remain high. Estimates running all the way up to 8 million units for the auto industry next year mean that both copper and aluminum foundries supplying motordom will keep busy. Aircraft, both civilian and military, will continue to consume large tonnages of aluminum castings. An airplane contains up to 2000 lb of aluminum sand and permanent mold castings. The guided missile program also will spur the use of castings, both aluminum and magnesium.

At the beginning of this year, foundrymen were predicting that 1955 would surpass 1954 by 15 per cent. It wouldn't have been a bad guess if metal supply had held up. Most shops would have done a little better if they could have got more metal at a reasonable price. This is the main problem looming in 1956.

A Matter of Price — As it is, many industry officials say that it isn't so much a shortage problem as it is one of price. While much is said about not enough aluminum or copper, few shops have had to curtail operations because of a lack of metal. The pinch in supply has resulted in higher metals prices, and that's where the rub comes in. One Cleveland foundry manager says his bronze business is off last year's volume by 80 per cent, mostly because the metal is so "sky-high, designers are doing everything to avoid using the material."

Everett G. Fahlman, president of the Aluminum Association, says that some customers have tried to balk at the higher cost of aluminum castings, but "if they need the parts, there isn't much anybody can do. This kind of a situation puts the fixed-cost shop in a tight squeeze." If they want to keep the business, the founders have to absorb some of the increase, which cuts into their profits which are already thin.

Still Tight — The new year doesn't hold much promise of better metal supply. Mr. Fahlman sees the aluminum shortage prevailing through 1956 as long as business confidence remains at the high level it is now. Government help in the form of stockpile cancellations will help, however. One foundryman maintains that it is this help which has kept many shops from suffering severe loss this year. But he claims it won't help in increasing business because new uses for light-metal castings are coming up almost each day.

Copper and its alloys will not be much better off unless present high-level production continues unabated for the year. In some cases, even a better supply won't revive casting activity for the metal. One founder says: "I don't know how I would handle the business even if I could get bronze at a reasonable price. I've filled my schedules out with aluminum castings."

Secondary Considerations — In the final analysis, the secondary smelters hold the solution to the problem. Prices of secondary metals have been anything but stable for the past year. Founders don't have any assurance that the price they quote one week will be good even by the time they get the metal in their shops. For instance, the recent uptrend in secondary aluminum is contrary to the seasonal pattern. The price usually lets up a bit in December.

Effects of the government's export restrictions on scrap are beginning to show up, some founders think. There is plenty of scrap to be had, they point out, because high-level operations generate a lot of the material. If the scrap can be kept on this side of the ocean, it will help increase the secondary yield and relieve the shortage. If in turn, secondary smelters can stabilize or lower their prices, foundries will use more secondary metal and business in 1956 may pick up.

What Price Clean Air?

As much as $750 million may have to be spent to eliminate smog in the Los Angeles area. So says Dr. Lee A. DuBridge, president of the California Institute of Technology.

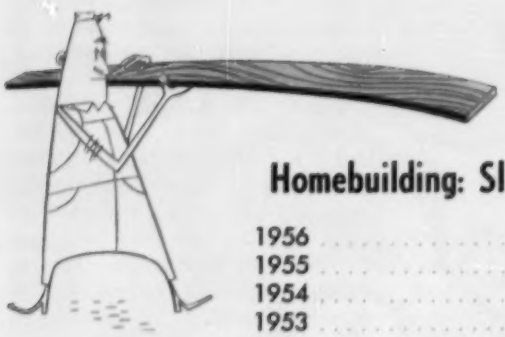
"You and I are the smog producers," he told a Kiwanis meeting, "and you and I will have to pay for the gadgets which somebody will invent to put on our cars. Let's stop looking for a scapegoat. It took $750 million to get pure water for Los Angeles. Dont be surprised if it costs as much to get pure air."

Nonferrous Castings

(Net tons, excluding diecastings)

	1953	1954	1955
Aluminum	209,346	189,841	241,000*
Copper & Copper Alloys	495,248	414,710	514,500*
Magnesium	14,189	10,474	11,400*
Totals	718,783	615,025	766,900*

*Last 3 months estimated by STEEL. Other figures: U. S. Bureau of Census.



Homebuilding: Slight Dip Expected

1956	1.2 million
1955	1.3 million
1954	1.2 million
1953	1.1 million
1952	1.1 million
1951	1.1 million
1950	1.4 million

Housing: Good Year Ahead

HOMEBUILDING outlook for 1956: A comparatively slow start, but quickening second-half activity to bring the year's total to 1.2 million units.

That'll make it the third or fourth best year (see table). Dollarwise, 1956 may be only slightly below this year's estimated $16.3 billion. Reasons: Building costs will rise; there's a trend toward larger homes.

A Slump—The rate of new housing starts has been dropping since August, Bureau of Labor Statistics figures show. Seasonal influences are a factor.

John M. Dickerman, executive director of the National Association of Home Builders of the U. S., says there are two other causes:

1. Drumfire attacks this year that charged the industry with overbuilding, creating excessive mortgage debt, boosting inflation.
2. Credit restrictions applied by the government at the end of July.

Exacting—In insuring loans at that time, the government increased the down payment requirements and shortened the maximum maturity from 30 to 25 years on both FHA and VA mortgages. VA requirements were raised from no down payment to 2 per cent; FHA down payments for the first $9000 in a mortgage were boosted from 5 to 7 per cent and from 25 to 27 per cent of the amount in excess of $9000.

Because of lag and lead-time factors in home building, the full impact of the credit restrictions aren't expected much before spring —that's the business being contracted for now.

A Certainty — Administration planners aren't going to let tight money practices contract homebuilding levels too far.

Comments Mr. Dickerman: "We'll see as many houses built as the money supply permits; mortgage money availability and terms will be the basic limiting factors."

Some of the plus factors in the outlook for next year: The population shift to the suburbs will continue; expected high-level business conditions will keep incomes high; and loan defaults show no indication of going above the one-half of 1 per cent average of the last four years. Don't overlook the fact that this is an election year and a tax cut is possible.

Prefabs—National Homes Corp., Lafayette, Ind., is winding up its top year as the nation's largest prefab home builder. Says James R. Price, president: "Sales this year will total better than 25,000 units, compared with 20,203 in 1954. In 1956, we'll sell over 30,000 National homes."

On the minus side of next year's outlook is the decline in family formations which is expected to continue three or four years.

But population gains and a sharp upturn in family formations expected in the early 1960's paint a bright long-term picture for home building. An expected slight dip next year doesn't affect the hue.

Plastics Sets Record in 1955

A 35-per-cent gain over 1954 brings a new sales record to plastics and synthetic resins. *Modern Plastics* says sales this year will total 3½-billion lb.

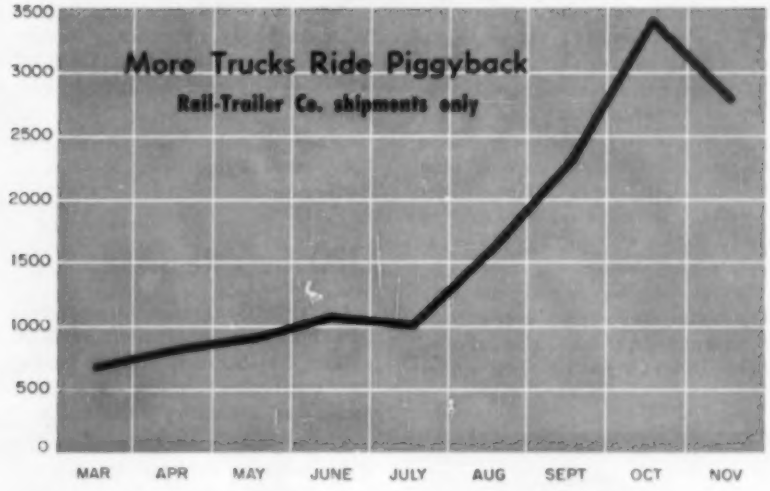
No new developments have accounted for the upsurge in sales; the bulk of the record poundage has gone into established uses.

Outlook is for another banner year in 1956, with the plastics component factor in almost every product constantly increasing.

Vinyl plastics, polystyrene molding material and polyethylene are big factors in the sales jump. Automotive and construction applications account for a considerable part of total plastics sales.

Plus Factors in Homebuilding

1. Continued population shift to suburbs
2. Trend toward larger, more costly homes
3. Personal income in '56 should remain high
4. It's an election year; taxes may be cut
5. Credit restrictions will be lifted if necessary



Piggybacking Makes a Hit

PIGGYBACKING is gaining popularity. One yardstick: Growth of Rail-Trailer Co., Chicago.

It started Chicago-to-Philadelphia-to-New York piggybacking last March. Trucks shipped via railroad cars in that month totaled 650; October shipments (see chart) hit 3400.

How It Works—Rail-Trailer operates as an independent agent between the Pennsylvania Railroad and motor common carriers. It sells the service to truckers, handles all terminal loading and unloading services and operates a pool of 650 trailers for lease to truckers for one-way service. Terminals are owned by the railroad and leased to Rail-Trailer.

First expansion in May by the company was the extension of service to St. Louis. In October Pittsburgh was added, and last month it signed with Norfolk & Western Railway to provide service between New York, Philadelphia, Roanoke, Va., and Bristol, Tenn.

Growing—Kenneth Ketzel, Rail-Trailer sales manager, reports that about 40 trucking firms are using the piggybacking service regularly. He also has agreements with another 100 to explore the possibilities for service.

Don't look for lower rates soon. "Industry's immediate benefit," Mr. Ketzel emphasizes, "will be more flexible, reliable and damage-free service than either trucks or roads can offer independently."

Rail-Trailer looks for continuing increases in shipments on existing facilities, plus the opening of some new territory, in 1956. To the question on western expansion, officials will admit only to talking with certain railroads. But they just opened a Kansas office.

Hassel Over Freight

Storm brews over ICC examiner's report on steel rate increases. Decision to take three months

MICHAEL T. Corcoran, examiner for the Interstate Commerce Commission, has stirred up a first-class controversy. Last August he recommended that eastern freight rates on such steel products as sheet, strip and tin plate be increased up to 5 cents for 50 miles.

Lined up against him are more than 200 metalworking companies, associations like the Industrial Fasteners Institute and about 20 basic steel producers.

Rebuttal — One brief of exceptions filed before the ICC came from 205 metalworking companies. Their annual take of steel is more than 2 million tons. It contends:

1. That Mr. Corcoran's suggested rate structure is unduly high, unrealistic and unrelated to costs of the carriers:

Heaviest increases would be felt in short hauls. For most companies, the average rate boost would be close to 30 per cent, since more than half of steel hauling is less than 100 miles.

2. That the rates would disrupt traditional business relationships:

Based on 1954 shipments, Mullins Mfg. Co., Salem, O., would be billed an additional $127,000. Mullins could avoid this by buying its steel from mills outside the area covered by the increase.

3. That there is no need for a minimum rate structure, and that present rates for iron and steel are not unreasonably low.

Prospects — Even the carriers aren't happy with Mr. Corcoran's ideas. Railroads, with approval from steel producers, suggest that rates on some steel products be boosted 2 cents per 100 lb up to 660 miles. Truckers assert this would be unfair, and that it is time for a complete re-assessment of policy.

It's going to take at least three months before the ICC makes up its mind. If its decision is as unpopular as Mr. Corcoran's, the case will probably end up in federal court.

WINDOWS OF WASHINGTON

AEC Puts Out Welcome Mat

Look for AEC to open the door to industry participation in atomics. Production of materials and chemicals will be encouraged, more AEC patents will be released for license

THE ATOMIC Energy Commission is inviting industry to get into the act. With Congress carping that AEC isn't going about the job fast enough, activity will probably step up.

Wanted by AEC: Proposals from private industry for supplying up to 100,000 lb of reactor-grade beryllium a year for five years. Supplies now come from a government plant at Luckey, O., operated for AEC by Brush Beryllium Co. If private industry proposals are acceptable, the Luckey plant will be put on stand-by. At present, the AEC has no plans for beryllium supplies for commercial projects.

Item—Private industry can submit proposals to the AEC for the production of refined uranium compounds until Oct. 1, 1956. Deadline had been Mar. 31. First-delivery date is likewise lengthened, to Apr. 1, 1959, instead of July, 1958.

Uranium trioxide has been added to the list of compounds acceptable as a final product. Originally, the commission wanted uranium tetrafluoride or uranium hexafluoride.

Item—Forty-one more government-owned patents held by the AEC are available for nonexclusive, royalty-free licensing. Commission-held patents and applications released total 845.

Babcock & Wilcox Co., New York, is the first private company to get a lump-sum contract for fabrication of reactor fuel elements. It calls for 325 fuel assemblies costing $279.28 each. The work will be done at a new B & W plant going up at Lynchburg, Va. First deliveries are scheduled for July, 1956. Facilities at Oak Ridge National Laboratory which had made the elements will be available for "other work," says AEC.

Machine Tool Switch

The Department of Defense and Office of Defense Mobilization are considering (maybe even leaning toward) the Air Force's concept of machine tool buying—continuing modernization and replacement of going capacity rather than stockpiling.

The claimed advantage: Speedier step-up in production if called for by an emergency. Informed opinion is that adoption of such a plan wouldn't have much effect on net spending for machine tools by the armed forces, though it could cause a temporary slowdown.

Direct cash savings to the military could come from a reduction of storage charges on stockpiled tools. Older tools replaced under such a program would be sold as surplus.

Meet Lawrence J. Halderman: Director of Business & Defense Services Administration's General Components Division. This BDSA division is the focal point for matters of joint industry-government interest affecting manufacturers of machinery and equipment parts.

Mr. Halderman will be on leave from Timken Roller Bearing Co., Canton, O. He has been with Timken since 1923, having managed many of the company's field offices.

Meanwhile, the Air Force is loosening its own purse strings (STEEL, Dec. 5, p. 83). That service was originally allotted $84 million for machine tools this year. Under economy measures, spending was halted after some $15 million had been obligated, then was reactivated on a smaller scale.

Because of the time loss, there's doubt that Air Force can let contracts even for the reduced amount. As of early this month, it had about $55 million to go.

Other machine tool news: The Navy is readying plans to step up its buying.

LIFO Gets Reprieve

Look for Congressional approval of a Treasury department move to extend the tax adjustment period for businesses using the LIFO method of inventory accounting.

Tax adjustments are permissible if inventories depleted by Korean war shortages are replaced before Jan. 1, 1956. The recommended extension would give industry another year, until Dec. 31, 1956, to effect replacement and still be eligible for the tax adjustment.

Since no Congressional action can be taken until after the first of the year, the extension will be retroactive. The proposal is supported by the Commerce department and by the Office of Defense Mobilization.

Here and There

Speaker of the House Sam Rayburn (Dem.,Tex.) flatly predicts that Congress will pass a road program . . . Government-sponsored disaster insurance will be one of the first proposals the Senate will take up in January . . . Small Business Administration will change its loan plans; details will come out some time after the first of the year . . . Thomas J. Sweeney, chief of the Veterans Administration's loan guaranty section, predicts that the 650,000-level of veterans' housing applications to VA in 1955 will continue at the same level in 1956.

Absolutely Vital

TO BETTER DEEP DRAWING

If deep drawing is one of the operations in your plant, you should know about the McKay Flex-Roll Processor, a rugged, efficient machine that quickly works steel to a degree that it can be deep drawn without tearing or showing draw strain.

Hundreds of manufacturers, including every major auto producer, have found the Flex-Roll pays for itself in a few months by substantially reducing scrap and metal finishing after the draw.

Let us put you in contact with a Flex-Roll user — he'll quickly convince you that it's absolutely vital to modern day deep drawing.

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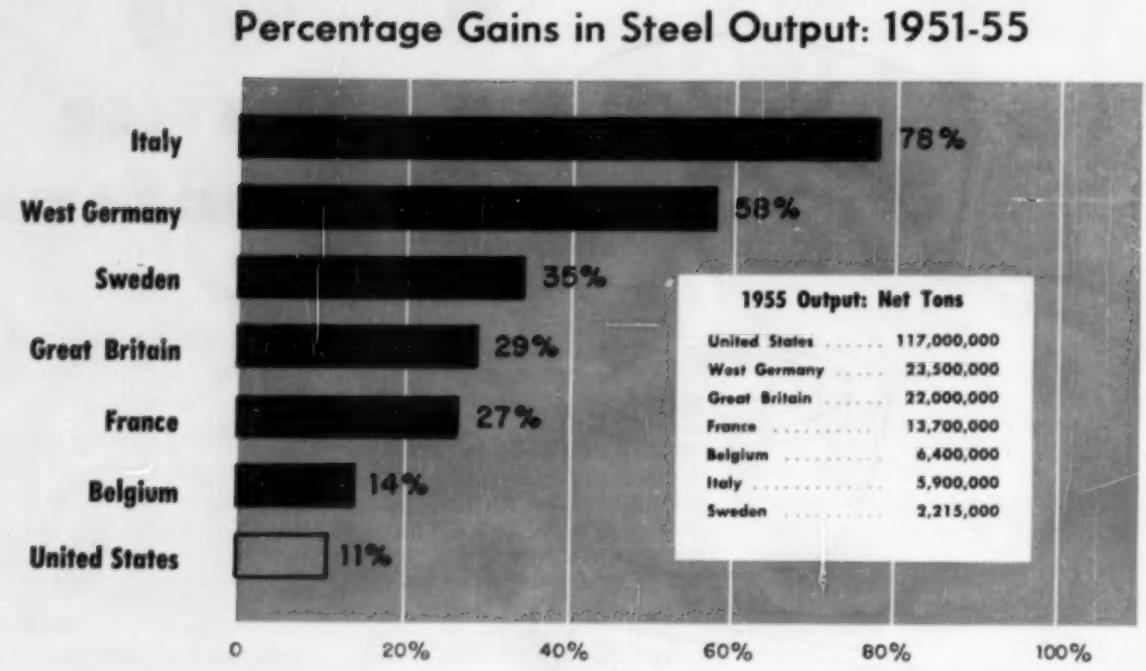


Swift increases in steel output pace . . .

Boom in Europe

SINCE 1951, principal West European countries have upped steel production almost 40 per cent. This year, they'll make some 73 million tons. By 1960, they will add at least 16 million, perhaps 20 million tons, to steelmaking capacity (about the same as the U. S.).

Industrial production figures tell the same story. They're up 70 per cent from before World War II. Almost all metalworking industries have broken records in 1955, almost all expect continuing improvement next year.

Consequences — Europe's reliance on U. S. economic aid is down from $4.1 billion in 1949 to $0.6 billion today. European demand for metalworking's raw materials and European competition for metalworking markets are giving U. S. producers many a headache.

The U. S. will export about 4.8 million tons of steel scrap this year, an all-time record. U. S. domestic scrap prices have risen from $35 to $50 a ton during the year. One of the big reasons for the increase in copper prices: Europeans have increased their take of the world's limited supply from 0.8 to 1.2 million tons in the last two years.

Since 1951, English bicycle makers have increased exports to the U. S. 306 per cent. German auto exports are up from just 400 to more than 30,000, and her radio exports have doubled. The U. S. market has been flooded by foreign sewing machines. Sweden, Italy and Japan have led the parade.

Parallel—Within Europe, 1956 will be time for consolidation. Labor is sitting on top of the heap. Great Britain has granted wage increases amounting to more than $56 million. But in the first eight months of 1955, more than 3 million working days were lost from strikes, more than in any full year since the war.

In all Western European countries, governments are wondering whether steps taken to curb inflation will be strong enough. With demand so high that production has lagged spending power and consumption, they've restricted credit, taxed profits, increased purchase taxes, etc. The big question: Will next year's labor demands start the inflation cycle anew?

Progress — Western Europe is looking to two major factors to solve her problems. Many industrial and labor leaders pin their faith to automation. In West Germany, Great Britain and the other metalworking leaders, progress runs closely parallel to that in the U. S.

Longer term, the atom may hold part of the solution. Great Britain, Belgium, Italy and France have commercial atomic energy programs under way. The first atomic electricity will be generated in France next year. By 1959, one site alone will have three plants totaling 55,000 kw. In 1960, France will be producing 100,000 kw of atomic power. Thereafter, her program calls for doubling of atomic plant every four years.

Consolidation — The European Coal & Steel Community is beginning to show favorable results for member nations. The industrial production index in community countries was up 12 per cent for

the first six months of this year, compared with 7 per cent in Great Britain and 9 per cent in the U. S. By November, members' output of steel was up to an annual rate of 60 million net tons.

Example: ECSC is allowing a bonus on each extra ton of pig iron used in making open-hearth steel. This scrap-saving program will run through March next year at least, and may well be extended.

Methods — European technical practice parallels what's going on here. Etablissements Cail in France is continuously casting steel, using both electric and open-hearth furnaces. Continuous casting is also going on in Great Britain, Austria and Sweden. One German plant has reached a production rate of 45 tons an hour. Italy and Switzerland are building plants.

Western European countries are enjoying a boom that's as strong as ours. Their problems are results of peak industrial production, and though setbacks may occur, it's unlikely that there will be any general slump. Just as in the U. S., industry appears to be headed steadily upward. But neither Western Europe nor the U. S. can afford complacency.

Iron Curtain—The U.S.S.R. and her satellites have been keeping pace. For the first half of 1955, their industrial production index was up 12 per cent, compared with 11 per cent for the rest of eastern Europe. Belgian, British, French and Swedish experts, fresh from an October visit, report that new Russian steel mills compare favorably with the best in Europe, though they're not up to U. S. standards.

Coal output in Poland (world's fifth largest coal producer) will hit 100 million tons this year. She's expanding steel capacity. Her new plant at Nowa Huta will produce some 1.6 million net tons a year. Bulgaria plans to have 250,000 tons of steel production by 1957. In Hungary, a large ore concentration plant is going in at the Sztalinvaros steel mill and a new automatic rolling mill will be running at Diosgyor by next year. Hungary claims that steel output is up 65 per cent since the beginning of the current five-year plan.

Planning—A new five-year plan for the Soviet Union starts in January, 1956; satellite countries have been co-ordinated, so that each will make what it's best qualified to tackle. Emphasis is on heavy industry and agricultural machinery.

The Soviet Union has had a bigger share in Western European trade than ever before this year. West Europe has had to have raw materials. The Soviet Union has supplied them—pig iron, semifinished steel and coal—just as we have. Comments one European: "For the U. S., it will be well to remember that Europe has to trade now, just as she needed aid after the war."

This summary concludes STEEL's series on Western Europe. The articles were prepared by STEEL's European staff, headed by Vincent Delport. J. A. Horton gathered material for the article on Great Britain. The French and Belgian reports were prepared by Leon Jaudoin and Paul de Kayser. Other authors: Dr. Erik Ruist, Sweden; Dr. M. d'Onofrio, Italy.

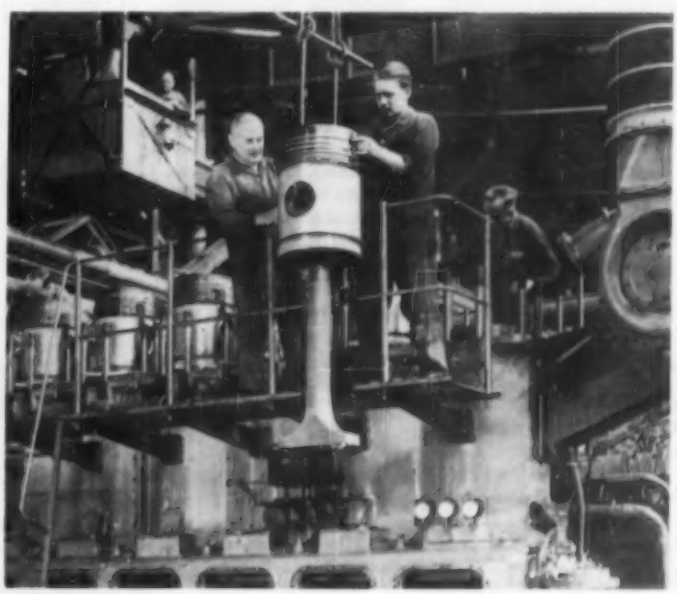
"WE BELIEVE in further economic development of Germany and other countries of the free world."

That's the philosophy of Dr. Ludwig Erhard, federal minister for economic affairs for West Germany. His exclusive statement to STEEL continues:

"... 1955 will bring a 10 per cent increase in our gross national product, with an increase of 15 per cent in industrial production alone.

"We have reached a stage of full employment. Further expansion will depend almost exclusively on increases in productivity.

"Our economy will continue to expand, but it cannot operate in isolation. We believe that the U. S. is as determined as we are to maintain economic expansion by appropriate policies. My forecast of future business activity includes a continuing favorable trend of export trade."



Supercharged marine diesels (375-2200 hp) are being turned out in quantity at Klockner-Humboldt-Deutz for booming German shipbuilding

GOOD HOUSEKEEPING MAY REQUIRE ADDITIONAL PLANT FACILITIES. Republic's Truscon Division can supply you with those facilities in a standard steel building. Illustrated is one of many types and sizes produced by the world's largest manufacturers of metal building products. Truscon steel buildings offer the economies of standardization—plus fire protection, ease and speed of erection, low upkeep, high investment value. They're low in cost and additions can be made easily and economically as space needs change.

This is good

HOW REPUBLIC MATERIALS HANDLING

GOOD HOUSEKEEPING CAN ALSO BUILD GOOD EMPLOYEE RELATIONS. For example, modern steel lockers that conserve space and still provide clean, safe storage for employees' clothing and valuables are made by Republic's Berger Division. Illustrated is the Republic "Space-saver" two-person locker. It provides separate compartments for two people in no more floor area than that required for one large single-tier locker. Berger offers a complete locker planning, engineering and installation service.

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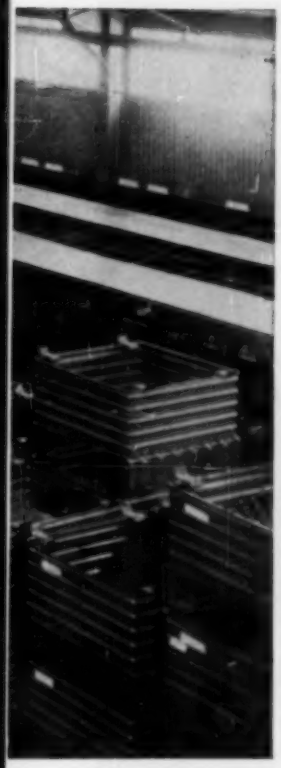
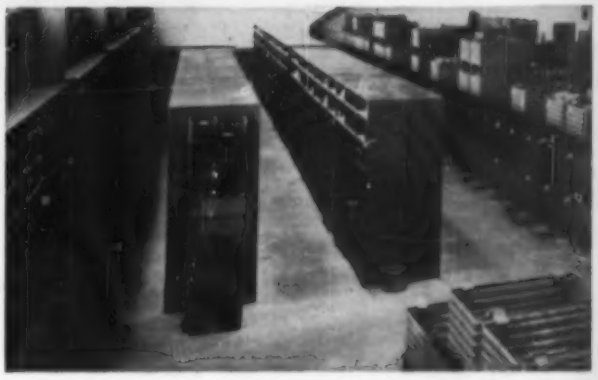


PB-120-T BOX AND SKID UNITS used by Chiksan Company are equipped with welded tiering lugs which permit tiering to any practical height. Units are easily lifted and rapidly trucked to any point on the production line or in the warehouse.

WEDGE-LOCK STEEL SHELVING made by Republic's Berger Division assists Chiksan greatly in keeping more accurate records, uses less space and provides easy visible identification of parts. It is specifically designed for high stacking of enormous weights. Completely flexible, it assembles quickly and easily.



housekeeping . . .

EQUIPMENT SAVED SPACE AND REDUCED HANDLING COSTS 25%

The above photos were taken in the Brea, California, plant of the Chiksan Company, makers of ball-bearing swivel joints. They have been using Republic Materials Handling Equipment for about eighteen months for both raw and finished materials.

Here are the results in the words of the Manager of Production and Material Control:

"Our experience is that much less space is required for storage of raw forgings and castings—which allows for better housekeeping and reduces handling costs 25%.

Inventories are much simpler and more accurate. Substantial time saving is realized.

Finished products are stored in both stack-type steel boxes and steel shelving. They assist greatly in keeping more accurate records, use less storage space and provide visible identification. We are able to do a better job with one less employee in the warehouse and to do good housekeeping with less effort.

The installation of these products was a wise and profitable investment."

Chiksan should enjoy future benefits as well. Maintenance costs should be reduced because construction features of all Republic Materials Handling Equipment assure long, efficient service at lowest per-year cost.

The PB-120-T Box and Skid Units illustrated on these pages are only one of many types manufactured by Republic's Pressed Steel Division. There is a wide range of sizes from which to choose. Or if you have a special handling problem, Republic engineers are available to help you design a unit to meet your specific requirements. Your Republic Materials Handling Equipment Dealer has all the facts. Or write us for more information.

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The power to transmit the commands of the operator *to the machine* . . . . . .

By means of the movable PENDANT CONTROL the start and stop of the spindle; selection of speeds, feeds and directional movements of all heads in feed or traverse are quickly and easily accomplished. Interlocks and a stopall stick provide safety for both operator and machine.

Additional features include:

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for vertical and horizontal motion of all heads — to assure fine smooth finishes with greater accuracy.

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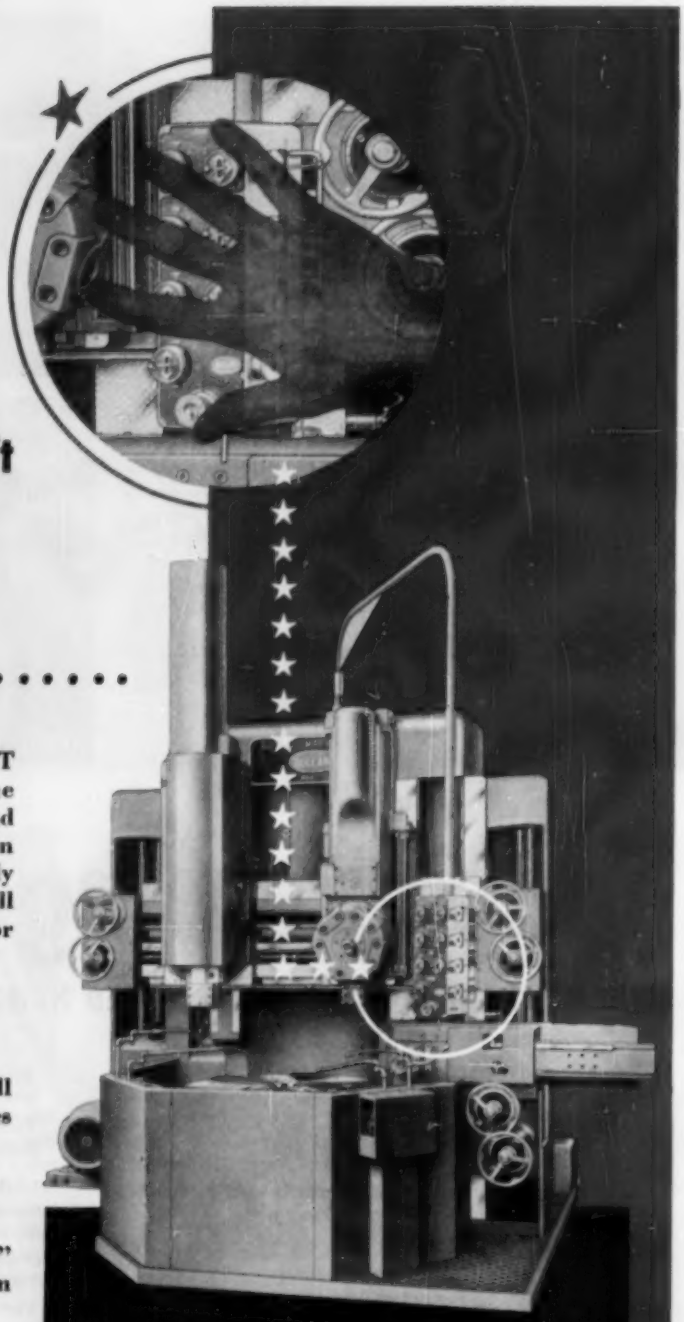
Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.



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CUTMASTER
VERTICAL TURRET LATHE
Model 75

AVAILABLE IN 26, 36, 46, 56, 66 AND 76 INCH SIZES

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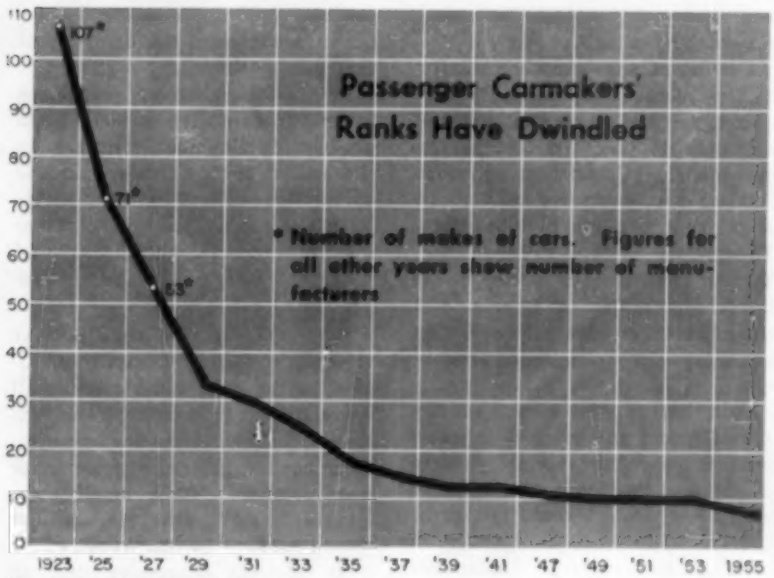

Source: Automobile Mfrs. Association

Six Automakers Left

AS THIS YEAR draws to a close with a record 7.9 million passenger car output, it's ironic to note the passing of another auto manufacturer, Kaiser-Willys.

The basis for this observation is a quiet decision by the firm which was first noted in this column last Jan. 17. At that time, Kaiser-Willys reported it would concentrate on four-wheel drive vehicles. Since then, it has terminated passenger car production. Until that decision is altered, the number of automakers must be considered reduced from seven to six, a number which includes Checker Cab Mfg. Co., besides GM, Ford, Chrysler, AMC and Studebaker-Packard.

Squeeze—Occurring in the year auto companies notched their greatest output, the retirement underscores the fact that as the market for passenger cars has grown, the number of companies serving the market has diminished (see chart above). Will that trend continue? Perhaps more importantly: If the trend does continue, where will it stop?

Recent Senate hearings showed it's about as easy to get material on that subject as it is to collect Kinsey report data in a radio interview. While little that merits legislative action can be found in the material presented, an interesting perspective is provided for considering the unspoken question: Will the auto industry some day be made up of only one or two companies?

Statement—In a 97-page statement before the committee, Harlow H. Curtice, General Motors Corp. president, observed that in 1910 and 1920 General Motors was in serious financial difficulty. Its resurgence and subsequent success dates, says Mr. Curtice, from 1921 when Alfred P. Sloan Jr. took charge and reorganized the corporation. About that same time an unidentified company (Ford Motors) was selling between 55 and 60 per cent of all automobiles in the American market.

"Yet it soon lost its dominance," says Mr. Curtice, "because it could not withstand the competitive drive of other companies."

Reasons—Mr. Curtice cited four principal reasons for the success of General Motors: 1. The dynamic growth of our country. 2. The even more rapid growth of the automobile industry. 3. Management structure. 4. The approach to problems.

He also reported that GM payrolls today are $3 billion, nearly six and one-half times those of 1940. Earnings of hourly workers today average $103 a week, compared with $38 in 1940. GM now has 541,000 shareholders—143,000 more than before World War II. It has 21,000 prime suppliers, many of them small businesses, to which it will pay more than $6 billion in 1955.

Growth — Elaborating on why GM was smitten with this growth, Mr. Curtice cited the organizational structure developed by Mr. Sloan which combines co-ordinated policy with decentralized administration and an approach to problems which is never satisfied with things as they are.

Mr. Curtice notes that the industry "is even more competitive today than at any time in its 50-year history. The only way that a company like General Motors can even stay where it is competitively is to work aggressively to better its position," he says. "To relax for a moment would be only to lose position." And GM hasn't taken a vacation in years.

Ford Position — Neither have GM's competitors in the auto business. Speaking for Ford Motor Co., Lewis D. Crusoe, group vice president, also harked back to the 1920s when Ford's share of industry's output was 62 per cent. But he noted that by 1941 Ford's share of the market had slipped to 18.8 per cent, largely because concentration of authority had become inadequate to cope with the exacting requirements of a rapidly changing market.

He described how authority was

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decentralized to fix responsibility. Adequate financial controls were set up, and product development was pushed ahead. As a result, in 1954, the Ford line achieved 25.4 per cent of the domestic car market.

Chrysler Markets—L. L. Colbert, president of Chrysler Corp. reported that in 1928, Chrysler Corp. was selling just under 6 per cent of the market. After purchasing Dodge Bros. Inc., the firm was in second place five years later. In every year, from 1933 to 1953, Chrysler products accounted for better than 20 per cent of the automobile market (except for strike-year 1950). In 1954, Chrysler's share dropped to less than 13 per cent; in 1955, it was back to 18 per cent.

The significance of these statements is, in essence, that nothing is fixed or permanent in the market standings of automakers. Every make now on the market has had its ups and downs during the last quarter of a century. And all the men quoted above point out that accurate appraisal of consumer demand, coupled with sound organizational structure, is vital.

They also point out that the automobile business is inherently risky and hazardous. General Motors gambled $600 million on its 1955 line of cars which were planned three to five years in advance. The fact that the magnitude of the error increases with the size of the company is an important factor in appraising the industry's future.

Nance Speaks—In his testimony, James J. Nance, president of Studebaker-Packard Corp., points out that there is no monopoly of product quality and value or of engineering or production skills. Moreover, he says that a small auto company is relatively large and that a company securing only a small per cent of total business can operate profitably and soundly, assuming its operations are basically efficient.

Noting that the smaller companies secured 10 per cent of the market until two years ago, Mr. Nance observes that these companies, in general, did not fortify themselves by modernizing their product and facilities and by strengthening their organizations. As a consequence, they were not well equipped to hold to historical percentages of the market.

Tooling Costs—Another factor in the picture, according to Mr. Nance, was the substantial postwar increases in costs of tooling for new models. Costs went up about 200 per cent, compared with about 15 per cent increases in auto prices. The obvious effect, says Mr. Nance, was to increase the premium on interchangeability of parts and components and to increase the advantages of multiple-line producers.

Additionally, the selling of different brand and price-class automobiles through single dealers maintained them in locations where single-line dealers could not prosper.

With the merger of Studebaker and Packard, Mr. Nance believes that his company is in a good position to compete and that at least the historical 10 per cent of the market is available to producers other than the Big Three.

AMC Position—American Motors Corp. President George Romney testified that AMC is basing its future on cars that are distinctive and unique.

"In our judgment," says Mr. Romney, "the country is in the early stages of basic changes in the pattern of car ownership and use. Some of our products are better suited to meet the demands of this new pattern.

"We are backing our confidence in the future with a $60-million product development program by the end of 1956. This will enable us to compete still more effectively in the market place by continuing to offer something new and different from our competitors' products."

Summary—In all cases it is clear that the testimony favors competition in the auto industry. In all cases, too, it is clear that the witnesses believe that an organization soundly managed can grow and prosper. What small companies lack in size they believe they make up for in flexibility.

It is most impressive that all the companies indicate much the same feeling about organization, business sense and meeting demand.

In Detroit, it is generally agreed that the present six makers will be able to hang on.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,669	236,635
November	748,559†	508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Nov. 19	179,250	133,969
Nov. 26	151,799	111,910
Dec. 3	177,712	144,995
Dec. 10	178,409	148,692
Dec. 17	170,392†	151,924
Dec. 24	168,000*	124,854

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

Ford Gets Tax Deduction

Ford Motor Co. will get income tax deductions on money it puts into trust funds under the current layoff pay plan, says the Treasury department.

The company has announced that its payments will go into two trust funds. One covers benefits to employees laid off from defense work. The other provides funds for those released from other company operations.

First fund deposits will begin next Jan. 30. The initial amount is scheduled to be about $10 million, which is equal to 5 cents an hour for every hour a worker has been paid since last June 6.

The Treasury decision moves Ford one step closer to its "payoff for layoff" agreement with the CIO-UAW. Only one more step remains. Enough states with a total of over two-thirds of Ford's UAW members must permit a jobless worker to receive full state unemployment at the same time he is drawing company layoff pay.

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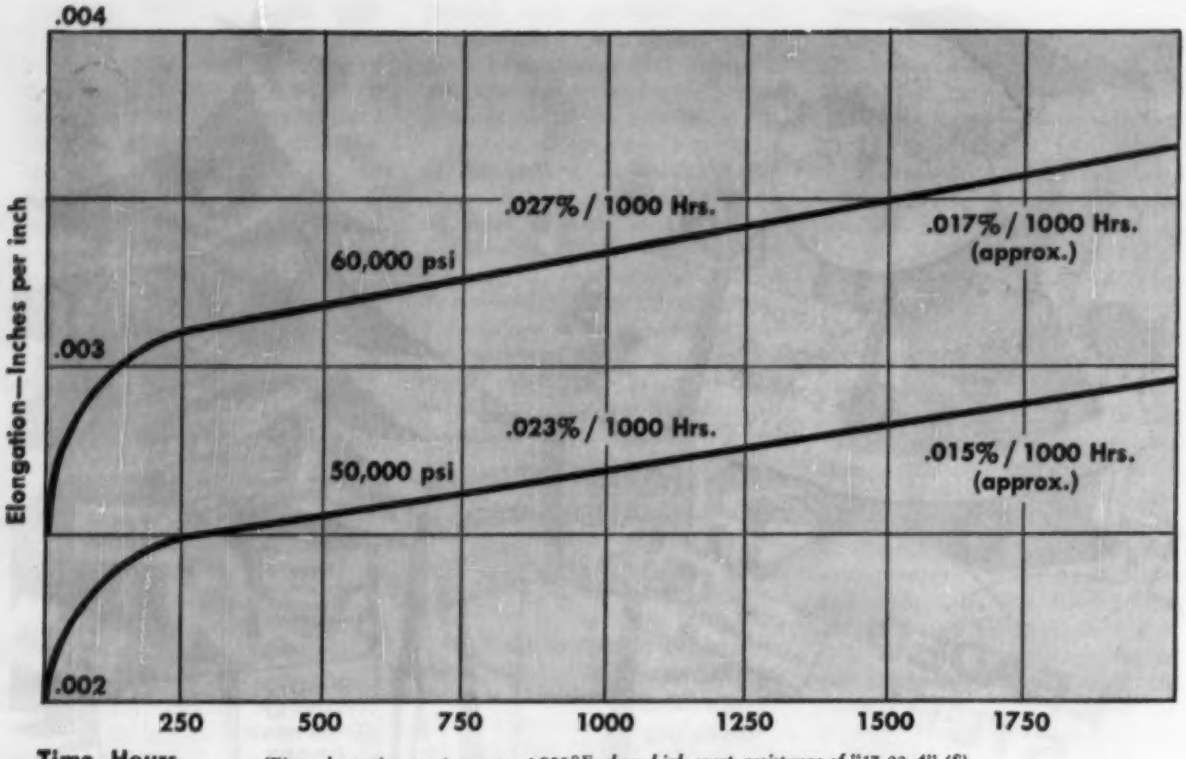


Time-elongation creep curves at 900°F. show high creep resistance of "17-22-A" (S)

How to get high turbine alloy performance with low alloy steel

IF you produce gas turbine parts or other parts that operate at temperatures as high as 1000 degrees F., you may feel you have to use an expensive high alloy steel.

But you can make parts that will do the same job, and save strategic alloys, using "17-22-A" (S) steel made by the Timken Company.

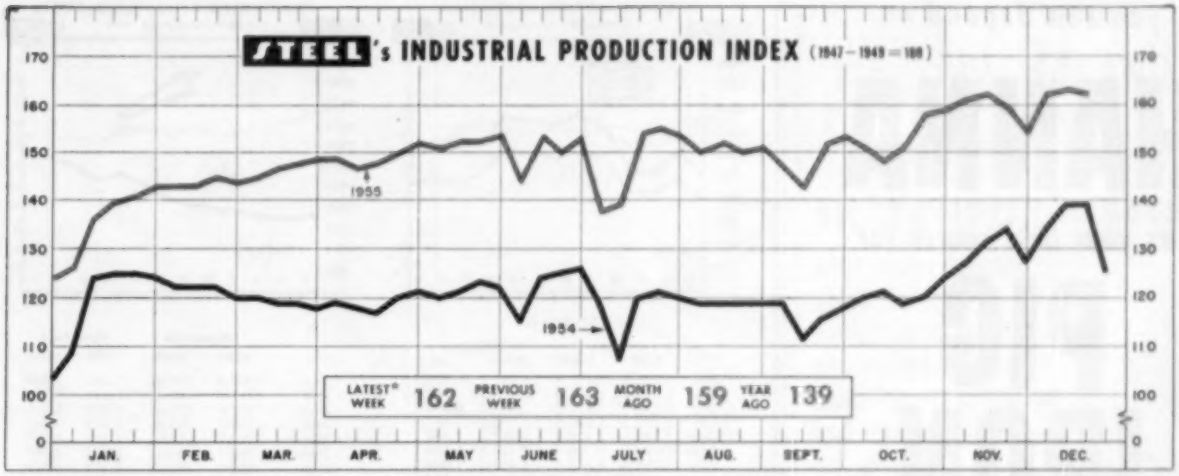
This steel helps you cut costs because it contains only 3% alloy. Yet it gives maximum creep resistance up to 1000 degrees F. The graph above shows it at 900 degrees F.

There are other advantages. "17-22-A" (S) resists heat checking and thermal cracking. It is readily workable up to 2300 degrees F. It's easy to machine and weld. And maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

For complete information on "17-22-A" (S) steel, and its companion analysis, "17-22-A" (V), recommended for temperatures up to 1100 degrees F., write for Technical Bulletin No. 36A. And for help with your high temperature steel problems, call upon our technical staff. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Dec. 17. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Business Confidence Sparks Outlook

"A BETTER YEAR than 1955 for American business and industry," predicts H. Thomas Hallowell Jr., president, Standard Pressed Steel Co., Jenkintown, Pa.

"The year 1956 may well be the best in our history," exclaims Emerson P. Schmidt, director of economic research, U. S. Chamber of Commerce.

"The business boom continues," claims the First National City Bank of New York.

"Business confidence is at an all-time high," says David Elliott, vice president, Cleveland Trust Co.

Confidence—Mr. Elliott pretty well sums up the feelings of businessmen generally. Confidence, that intangible factor which sparked the boom in '55, looks like it's geared up to repeat in 1956. With few exceptions, economists and businessmen alike, think that next year will see a continuation of high profits and increased production.

Business won't be trouble free, of course. Some sticky spots are cropping up already.

Problems — Mr. Hallowell predicts a better-than-1955 year, but warns: "Increasing shortages in manufacturing capacity, raw materials and labor are in sight on the general industrial scene for 1956."

Mr. Schmidt points out: "Our rate of growth through 1955 was phenomenal. But now we are operating at nearly full capacity. The rate of growth in 1956 cannot be so great as in 1955."

Hitting The Top—But these are problems of prosperity. And here are some of the segments of industry which indicate that prosperity will keep on coming.

Employment is picking up. Nonfarm employment jumped to 50.6 million in November, a 150,000 increase over the previous month. It has been growing this month, too.

Some of the demand is seasonal, as retail stores look for more Christmas help, but factory employment also set a record. It

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,353[1]	2,421	1,726
Electric Power Distributed (million kw-hr)	11,450[1]	11,426	9,846
Bitum. Coal Output (1000 tons)	10,765	10,450	8,878
Petroleum Production (daily avg—1000 bbl)	6,920[1]	6,923	6,341
Construction Volume (*ENR*—millions)	$348.8	$330.3	$271.8
Auto, Truck Output, U. S., Canada (*Ward's*)	204,191[1]	213,561	179,850
TRADE			
Freight Car Loadings (1000 cars)	700[1]	727	654
Business Failures (Dun & Bradstreet)	212[1]	219	223
Currency in Circulation (millions)[3]	$31,244	$31,070	$30,773
Dept. Store Sales (changes from year ago)[3]	+5%	+3%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,256	$21,591	$20,763
Federal Gross Debt (billions)	$279,966	$280,064	$278,700
Bond Volume, NYSE (millions)	$19,467	$21,222	$40,178
Stocks Sales, NYSE (thousands of shares)	12,184	13,093	15,206
Loans and Investments (billions)[4]	$85,451	$85,337	$85,583
U. S. Govt. Obligations Held (billions)[4]	$29,559	$29,643	$36,752
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	270.5	268.3	216.9
All Commodities[7]	111.0	111.1	109.4
Commodities Other than Farm & Foods[7]	119.4	119.4	114.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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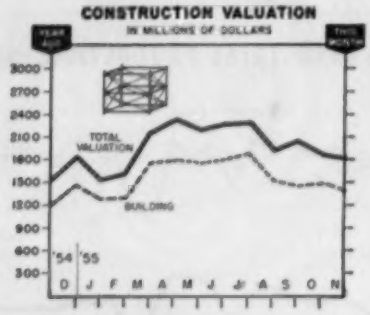
THE BUSINESS TREND

CONSTRUCTION VALUATION

IN MILLIONS OF DOLLARS



.37 States

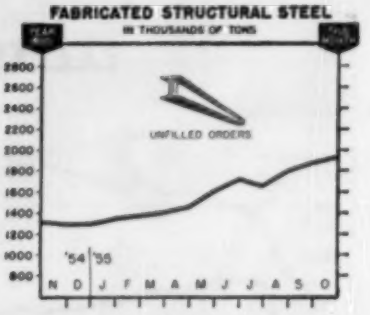
	Total		Building	
	1955	1954	1955	1954
Jan.	1,504.5	1,151.9	1,255.1	935.6
Feb.	1,581.1	1,221.3	1,278.6	977.5
Mar.	2,134.8	1,527.5	1,748.6	1,199.8
Apr.	2,322.1	1,691.9	1,776.1	1,401.6
May	2,185.1	1,925.3	1,737.1	1,497.6
June	2,256.2	1,733.3	1,793.7	1,376.7
July	2,271.5	1,836.9	1,851.6	1,386.9
Aug.	1,894.8	1,572.9	1,516.9	1,243.3
Sept.	2,034.9	1,816.2	1,442.2	1,424.2
Oct.	1,862.7	1,965.3	1,474.8	1,522.8
Nov.	1,796.8	1,498.9	1,388.3	1,199.8
Dec.	.....	1,828.8	.....	1,463.0
Total	.....	19,770.2	.....	15,628.8

F. W. Dodge Corp.

Charts copyrighted, 1955, STEEL

FABRICATED STRUCTURAL STEEL

IN THOUSANDS OF TONS



	Shipments		Backlogs	
	1955	1954	1955	1954
Jan.	225.8	245.6	1,346	1,686
Feb.	213.4	253.1	1,360	1,697
Mar.	227.8	285.4	1,392	1,645
Apr.	239.7	293.5	1,444	1,566
May	223.2	283.9	1,592	1,490
June	282.3	290.3	1,706	1,391
July	219.4	265.2	1,639	1,429
Aug.	268.0	272.5	1,776	1,270
Sept.	289.1	265.4	1,854	1,329
Oct.	283.8	258.4	1,928	1,294
Nov.	....	228.7	....	1,280
Dec.	....	223.5	....	1,281
Total	....	3,135.5		

American Institute of Steel Construction

jumped from 16.9 million in October to 17.1 million in November. These gains more than offset seasonal drops in construction and other nonmanufacturing activities.

Trouble Spot—There are only about 2 million workers left who aren't employed. That's out of a 67-million-man working force. Next year will see a scrabble for workers, which means wages will be higher to tempt men into the labor market. Another possibility—more interest in automation to carry a heavier production burden. Just where the technicians will come from to service automated machines is still unknown.

Increase In Inventories . . .

Inventories are starting a slow swing back toward the high levels they were at in 1953. Accumulation of inventory generally is a sign of confidence. It also can predict trouble if that gain is at a greater rate than counteracting sales.

Unadjusted manufacturing inventories in October went to $44.8 billion from $44.3 billion in September. Sales rose more slowly from $27.6 to $27.9 billion.

In addition, new orders dipped slightly in October while backlogs increased. All this indicates that confident manufacturers are putting in inventory, even though sales aren't quite enough to call for such a high volume.

The situation isn't at the danger point. It may be nothing more than a reflection of end-of-the-year confidence. If inventories continue to pick up at a faster rate than sales this next quarter, then it will be time to watch closely for overstocking.

Machine Tools Key to Profits . . .

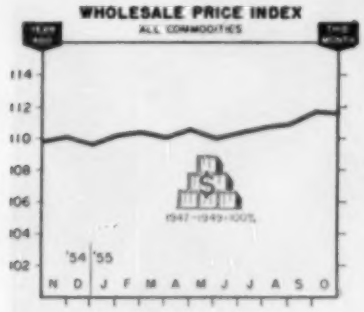
Confidence came early to a lot of manufacturers. Machine tool orders rose sharply in October following the Machine Tool Show. October orders were $103.4 million, compared with $61.3 million in September.

But the important difference is where these orders come from. Last year, the automobile industry was the chief source of new business for toolmakers. This year, they say orders are coming in from a wide variety of metal cutting companies.

Since orders are backlogged well into 1956, it's a pretty good bet that most businessmen are counting on more work.

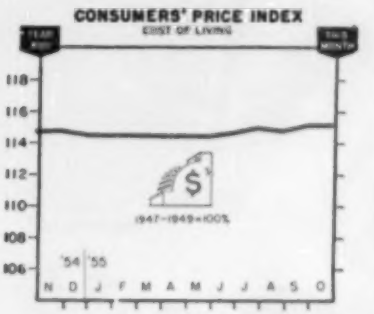
Railroad Orders High . . .

The Wabash Railroad has placed



	1955	1954	1953
Jan.	110.1	110.9	109.9
Feb.	110.4	110.5	109.6
Mar.	110.0	110.5	110.0
Apr.	110.5	111.0	109.4
May	109.9	110.9	109.8
June	110.3	110.0	109.5
July	110.5	110.4	110.9
Aug.	110.9	110.5	110.6
Sept.	111.7	110.0	111.0
Oct.	111.5*	109.7	110.2
Nov.	....	110.0	109.8
Dec.	....	109.5	110.1

U. S. Bureau of Labor Statistics
*Preliminary



	1955	1954	1953
Jan.	114.3	115.2	113.9
Feb.	114.3	115.0	113.4
Mar.	114.3	114.8	113.6
Apr.	114.2	114.6	113.7
May	114.2	115.0	114.0
June	114.4	115.1	114.5
July	114.7	115.2	114.7
Aug.	114.5	115.0	115.0
Sept.	114.9	114.7	115.2
Oct.	114.9	114.5	115.4
Nov.	....	114.6	115.0
Dec.	....	114.3	114.9

U. S. Bureau of Labor Statistics

orders for 2300 freight cars and three diesel-electric locomotives in anticipation of another good year for freight hauling.

New power and equipment orders by the Wabash for delivery in 1956 and 1957 run to an estimated total of more than $30 million.

These orders are an indication that railroads are looking for a good year. "Industrial activity next year will equal if not exceed that of 1955," forecasts John E. Tilford, president, Louisville & Nashville Railroad.

Aura of Cautious Optimism . . .

"Intelligent and alert credit operation, attentiveness to accounts receivable and the handling of credit expansion will have much to do with how individual corporations fare in 1956," say industrialists polled by the National Association of Credit Men, New York.

The association's analysts are unanimous in their confidence that next year will be good. Some foresee a slight decline in the second half as industry catches up with huge backlogs. Others think the slowup will come in the spring, with a fall revival following an ease on credit restrictions.

In either case, no serious gloom mongers are around who feel that next year will spell trouble for an industry which may just be getting its second wind.

Trends Fore and Aft . . .

Backlogs of industrial construction are approaching the highest levels since early in the Korean War, reports T. C. Williams, president, National Constructors Association, New York. . .Nontire rubber sales should reach about $2.2 billion (up 5 per cent) next year for Hewitt-Robins Inc., says Thomas Robins Jr., president. . . Natural gas pipeline construction is expected to run at least 20 per cent ahead of 1955, estimates Lloyd A. Dixon Jr., vice-president in charge of Meter & Valve Division, Rockwell Mfg. Co., Pittsburgh . . . General Motors announces it has built and tested an experimental gas turbine passenger car. Named Firebird II, the automobile with a titanium body will be shown at GM's Motorama, January 19-24, at the Waldorf-Astoria Hotel, New York. Harlow H. Curtice, GM president, says the car gives promise of operating as economically as present day models.

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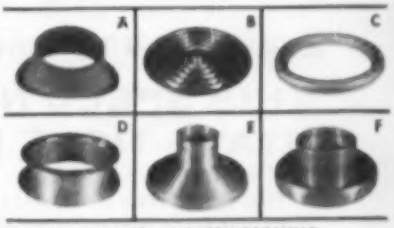
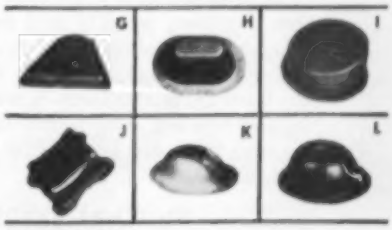


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.



HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

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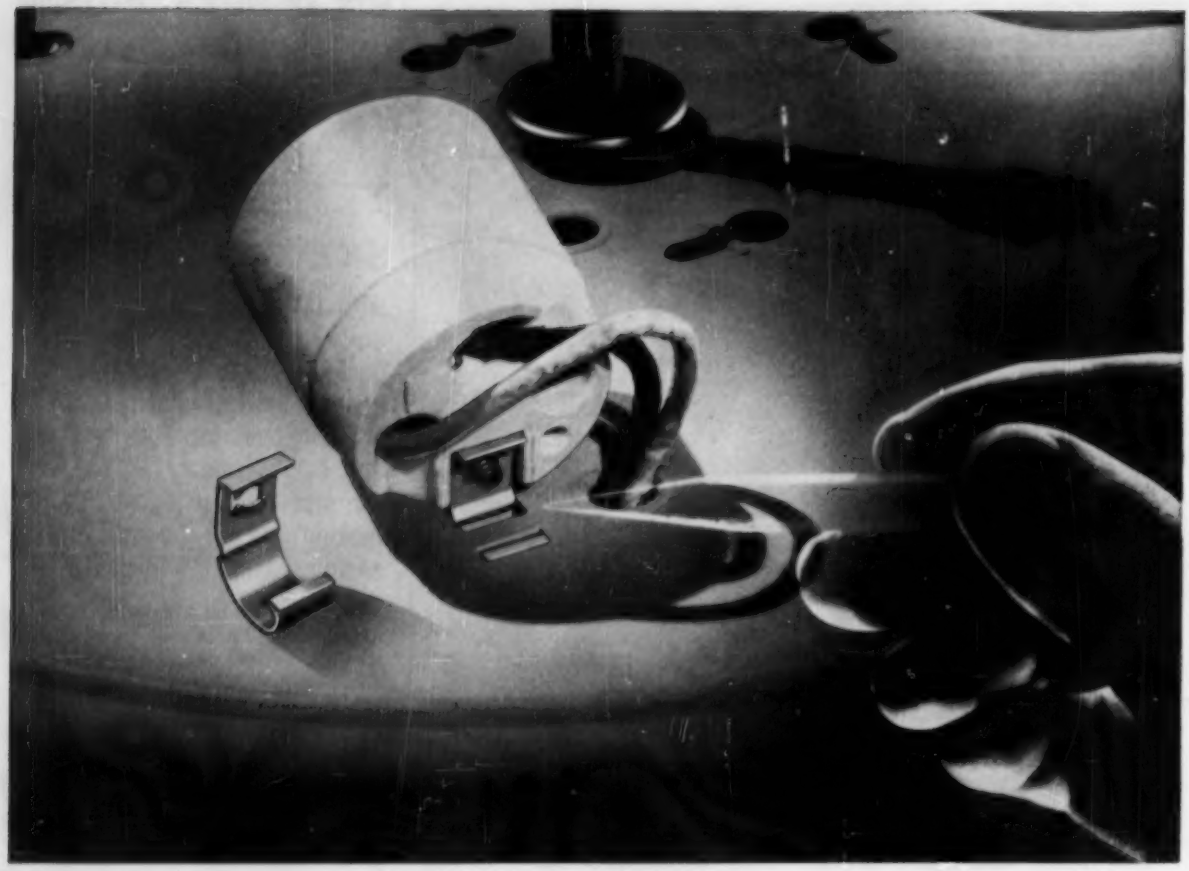

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HOWARD J. FINDLEY
. . . Cleveland Hobbing Machine president

Howard J. Findley was elected president of **Cleveland Hobbing Machine Co.**, Cleveland, filling a position vacated some two months ago by retirement of **William Staples.** Mr. Findley also was elected a vice president of **Fanner Mfg. Co.**, parent concern, and will be director of engineering and research for the Fanner organization. He was formerly with Eaton Mfg. Co.

Michael Gladstone was appointed sales manager of **Alloy Precision Castings Co.**, Cleveland. He is a former president of Centrifi-Cast Co. **Edward J. Vargo** was made chief metallurgist and **C. B. Beener** chief engineer.

Herman Van Eck, production control manager for **East Chicago Machine Tool Corp.**, fills the new position of manager of the firm's Balemaster Mfg. Division, East Chicago, Ind. He is succeeded by **John W. Rhodes.**

Thomas B. Spoehr was made general manager, aviation division, **Pheoll Mfg. Co.**, Chicago.

Robert J. Moore was made sales manager, packaged products, for **Westinghouse Electric Corp.'s** air conditioning division at Staunton, Va. With the appliance division since 1948, he was Pacific Coast district manager for consumer products.

GEORGE GORTON III
. . . heads George Gorton Machine Co.

George Gorton Machine Co., Racine, Wis., elected **George Gorton III** president; **Charles Gorton,** vice president - manufacturing; **James Gorton,** vice president-research and development; **Walter B. Tomlinson,** vice president-treasurer; **Howard C. Holmdohl,** secretary; and **John Elholm Jr.,** assistant secretary.

F. S. Cornell was elected executive vice president of **A. O. Smith Corp.**, Milwaukee. He was vice president and general manager.

William M. Briner, supervisor of industrial relations, was named production control manager in the fastener division at **Standard Pressed Steel Co.**, Jenkintown, Pa. He succeeds **William M. Kerrigan** who joins the sales staff of the aircraft division. **Fred C. Gartling** succeeds Mr. Briner and assumes the title of personnel manager.

John B. French was made western manager-sheet product sales with **Columbia-Geneva Steel Division,** San Francisco, U. S. Steel Corp.

Galland-Henning Mfg. Co., Milwaukee, appointed **Raymond F. Gruettner** general manager to succeed the late **William A. Peterman. William W. Raasch** was named head of malting machinery sales in addition to his post as chief engineer. **Robert J. White** was named purchasing agent.

E. B. SUYDAM
. . . president of Linde Air Products

E. B. Suydam was elected president of **Linde Air Products Co.**, New York, division of Union Carbide & Carbon Corp. He succeeds **T. D. Cartledge** who continues as a vice president of the corporation. Mr. Suydam has been vice president of Linde since 1942.

William Tucker was elected president and chief executive officer of **F. C. Russell Co.**, Cleveland. He succeeds **Frank C. Russell,** president and founder of the firm, who is now chairman of the board. Mr. Tucker joined the company a little over a year ago as vice president and director of manufacturing. He later was made executive vice president and assistant to Mr. Russell.

C. G. Crawford was made sales manager of **Baldwin-Lima-Hamilton Corp.'s** line of hydraulic turbines and related equipment. He is at Philadelphia. He was sales manager for the Pelton Water Wheel Division in San Francisco.

Roy A. Hall was appointed manager of the tank and boiler head sales division of **Ackermann Mfg. Co.**, a sales subsidiary of Wheeling Steel Corp., Wheeling, W. Va.

O. W. Clifton was made executive vice president and **A. R. Smith** vice president - manufacturing of **Victor Mfg. & Gasket Co.**, Chicago.

Clayton K. Baer was made man-

LOREN C. HURD

D. C. BRADLEY

. . . Metals Disintegrating president and division mgr.

ager of the Milwaukee sales branch of **Crucible Steel Co. of America.**

Loren C. Hurd was elected president and a director of **Metals Disintegrating Co. Inc.**, Elizabeth, N. J., succeeding the late **Harold E. Hall.** Mr. Hurd was technical director of the export department of Rohm & Haas Co. **D. C. Bradley** was made general manager, Pulverizing Machinery Division, Summit, N. J.

John W. Craig was elected vice president of **Westinghouse Electric Corp.**, Pittsburgh, and general manager of its electric appliance divisions. He succeeds **John H. Ashbaugh** who remains as a Westinghouse vice president and special consultant to **C. J. Witting,** recently made vice president, consumer products group. Prior to joining Westinghouse, Mr. Craig was vice president of Whirlpool - Seeger Corp.

Pierce M. Welpton was elected chairman of the board of **Bridgeport Rolling Mills Co.**, Bridgeport, Conn. He succeeds **George D. Stearns** who continues as a director and will be active in the management of the firm.

Warren C. Dunn was made assistant manager, general apparatus sales department of **Union Switch & Signal Division,** Westinghouse Air Brake Co., at Swissville, Pa.

International Resistance Co., Philadelphia, appointed **Maj. Gen. George I. Back,** U.S.A, ret., assistant to the president. He will investigate new markets for products and processes developed in its research department.

Alco Products Inc., Schenectady, N. Y., appointed **Paul N. Strobell** marketing manager for atomic energy products; **Herbert M. Short,** product manager of renewal parts; and **Frederick Townsend,** locomotive product manager.

J. Joseph Kelly was elected vice president-sales and **Frederick W. McIntyre Jr.** vice president and works manager of **Reed-Prentice Corp.**, Worcester, Mass., an affiliate of Package Machinery Co. Mr. Kelly was general sales manager.

Joseph Horacek Jr. was made assistant sales manager, **Turco Products Inc.**, Los Angeles. He was with Hercules Powder Co., most recently in charge of west coast sales for industrial chemicals.

Blaw-Knox Co., Pittsburgh, appointed **David Lyle** vice president-rolling mill engineering for its Continental Foundry & Machine Division and its Lewis Machinery Division; **A. E. Murton,** vice president-roll sales, Continental Foundry and Blaw-Knox Rolls Division; **Dr. F. H. Allison Jr.,** vice president-roll metallurgical research, Continental Foundry and Blaw-Knox divisions. **B. P. Hammond** was named vice president-eastern casting sales and **H. A. Forsberg** vice president - western casting sales, both of Continental Foundry & Machine Division. At Copes-Vulvan Division, Erie, Pa., **G. L. Davis** was named vice president in charge of the division; **W. L. Hunter,** vice president-general manager; **D. E. Hibner Jr.,** vice president-sales; and **C. E. Smith,** vice president-manufacturing.

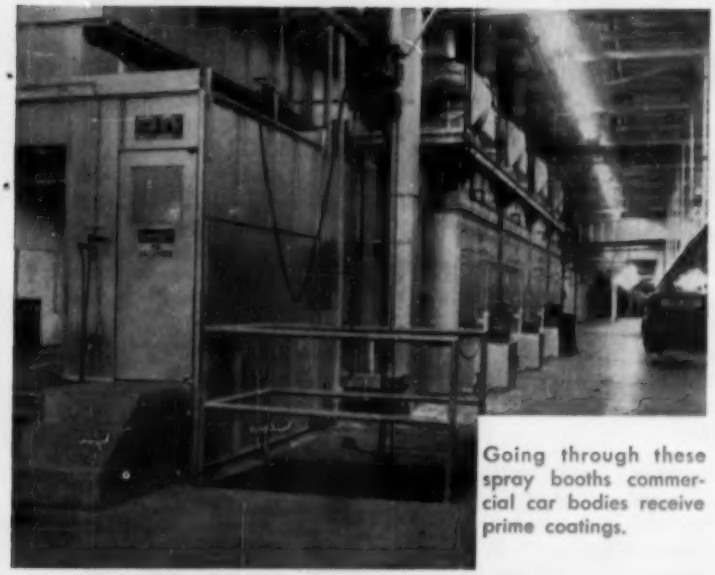
Admiral Corp., Chicago, elected **George A. Bodem** to the new post of vice president-electronics division and **James R. Oberly** vice president-appliance division. Mr. Oberly continues as president of

J. JOSEPH KELLY

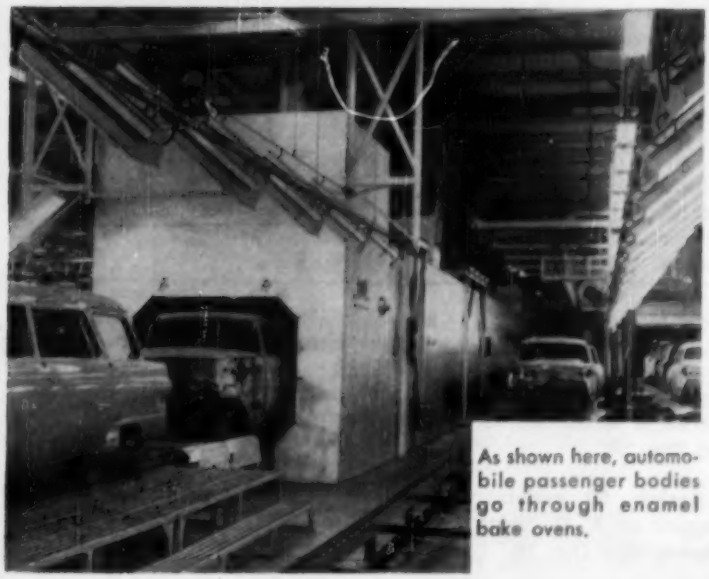
FREDERICK W. McINTYRE JR.

. . . newly elected vice presidents of Reed-Prentice

Watch 'em go by — when FINISHED in P-D equipment — for a Fine Future



Going through these spray booths commercial car bodies receive prime coatings.



As shown here, automobile passenger bodies go through enamel bake ovens.

A major automobile manufacturer has recently completed construction of a plant and facilities in a southern city. In this new plant a complete finishing system has been installed by PETERS-DALTON. P-D engineers laid it out on a one floor level to conform with the manufacturer's precept. Automobile bodies pass through the several finishing stages, including metal washing, wet sanding, bonderizing, prime coating and final multi-color paint finishing, in rapid succession. The assurance of this smooth and safe production is largely due to the P-D Hydro-Whirl Method of cleaning paint-laden air. The entire finishing system is set up to meet the public's demand for varied and multi-colored automobile finishes without any delays or change-overs that could cause production schedules to bog down. To do this requires special equipment — designed, engineered, and fabricated by a firm which has established its reputation of having the knowledge and experiences so essential for meeting special finishing needs.

Manufacturers in widely varied phases of industry recognize the efficiency of P-D design and engineering, knowing that Peters-Dalton specializes in the installation of tailor-made finishing systems to meet all industrial requirements—from a single spray booth to the development of complete finishing systems such as this.

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- *Industrial Washing Equipment*
- *Drying and Baking Ovens*
- *Hydro-Whirl Dust Collecting Systems*

RICHARD H. LATIMER
. . . plant superintendent at Colson Corp.

GEORGE E. PIPER JR.
. . . Keystone Steel & Wire research post

PAUL H. RICHARDSON
. . . Hartford Special Machinery v. p.

Admiral International Corp., export subsidiary.

Richard H. Latimer was named plant superintendent of **Colson Corp.**, Elyria, O., to succeed **Arthur Davis**, retired. Mr. Latimer was plant superintendent for Eagle Mfg. Corp.

American Zinc, Lead & Smelting Co., St. Louis, elected **W. J. Matthews Jr.** vice president-treasurer; **Clarence V. Burns**, vice president-controller; and **Ralph C. Perkins**, secretary (continuing as chief counsel). **Dale I. Hayes** was made assistant to the president with headquarters at Knoxville, Tenn. He is replaced as western manager at Salt Lake City, Utah, by **Ralph E. Calhoun.**

George E. Piper Jr. was appointed director of product and market research of **Keystone Steel & Wire Co.**, Peoria, Ill. He was with Fuller & Smith & Ross Inc., Cleveland advertising agency.

James H. Brockway was made general sales manager of **Reif-Rexoil Inc.**, Buffalo. He was formerly with Fedders-Quigan Corp.

Kearney & Trecker Corp., Milwaukee, appointed **James Flannery** assistant chief engineer, **John Lukey** assistant development engineer and **John Jorgenson** chief design engineer for special machinery.

Martin C. Carroll was made director of research and development for **Skil Corp.**, Chicago.

Paul H. Richardson was named vice president-engineering, **Hartford Special Machinery Co.**, Hartford, Conn. He was general manager of Paragon Gear Works Inc. **Michael L. Kendall** was made engineering and maintenance consultant for Hartford in the Detroit area.

Robert F. Kniffin was made assistant industrial engineer, Cleveland steel plant, **Republic Steel Corp.** He succeeds **J. Vaughan Byrne**, who transfers to the general office.

Vanadium-Alloys Steel Co. named **R. D. Bardes** to replace **John N. Sturmer** as St. Louis district manager, and **Charles A. Lundy** to replace **Fred W. Potts** as Cincinnati district manager.

OBITUARIES . . .

Thomas S. Wright, 53, western sales manager, **Champion Rivet Co.**, died Dec. 9 in East Chicago, Ind.

Robert J. Kay, 48, sales manager, merchant trade products, **Northwestern Steel & Wire Co.**, Sterling, Ill., died Dec. 6.

James McElgin, 54, manager, metalworking department, **E. F. Houghton & Co.**, Philadelphia, died Dec. 7.

Walter H. Dreis, 67, president, treasurer and general manager of **Dreis & Krump Mfg. Co.**, Chicago, died Dec. 8.

Frank J. Stippe, 70, president, **Chicago Wire, Iron & Brass Works**, Chicago, died Dec. 10.

William E. Keskey, 59, assistant purchasing agent at **A. O. Smith Corp.**, Milwaukee, died Dec. 10.

Harry G. Haake, 61, vice president of **Ceco Steel Products Corp.** in charge of its west coast operations, died Dec. 3 in Los Angeles.

Horace P. Liversidge, 77, chairman of the board of **Philadelphia Electric Co.**, Philadelphia, died Dec. 8.

Harold S. Sharp, 67, president, **Sharp Heating & Supply Co.**, Cleveland, died Dec. 8.

Lorn Campbell Jr., 63, president, **Harris Calorific Co.**, Cleveland, died Dec. 12.

Marshall E. Reid, 69, chairman of the board of **Reid-Avery Co.**, Baltimore, died Dec. 5.

Carl E. Schleicher, 55, assistant chief engineer, **Easton Car & Construction Co.**, Easton, Pa., died Nov. 26.

William S. Anderson, 78, president, **Shoe Press Corp.**, died Dec. 8 in Philadelphia.

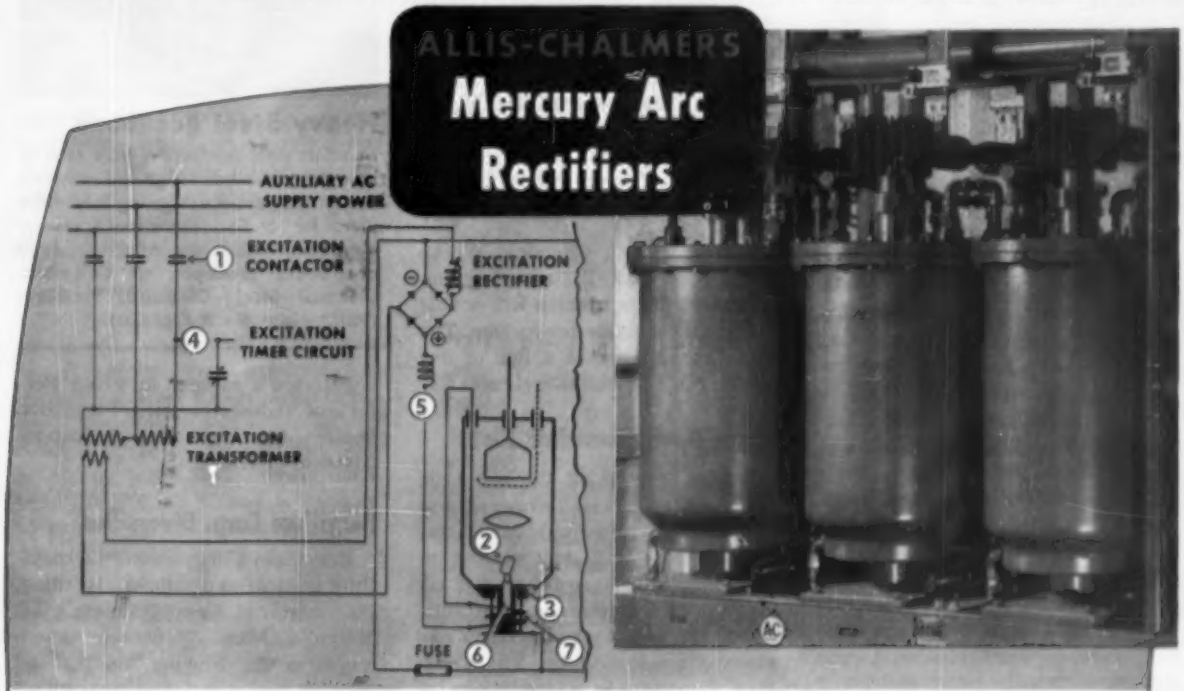
For Reliable Rectifier Operation Get

Continuous Excitation

Allis-Chalmers excitron rectifiers eliminate the need for a pulse-type firing system timed for operation every cycle. Maintenance is easy because of the simplicity of design.

A small dc excitation arc is automatically ignited only once, when the unit is started, and then maintained on the mercury cathode of each rectifier tube. It offers advantages similar to a pilot light. Since it is far easier to maintain an arc than to start it, this feature makes the excitron far less likely to lose excitation during power supply disturbances than other types of rectifiers.

Get all the facts about excitron rectifiers before your next installation. Call the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Supply of DC Provides Key to Continuous Excitation

Direct current supplied from excitation rectifiers is the key to continuous excitation. When the excitation system is energized by means of a contactor (1), positive dc potential appears on the excitation anode (2) of each tube, negative at the cathode (3). A timer (4), through contacts of the excitation failure relay (5), is energized at the same time.

As soon as voltage is applied, current flows from the anode to the cathode through the ignition plunger (6). This current energizes the ignition coil (7) and causes the plunger to be pulled below the mercury surface. As the plunger travels down, an arc is drawn which transfers from the graphite tip of the plunger to the mercury. This current flow keeps the coil energized, maintaining a continuous arc.

If excitation failure should occur while the rectifier is carrying load, the plunger is released, floating upward in the mercury until it makes contact with the anode, then repeating the process above until the arc is re-established.

Re-establishment of the arc as outlined takes less than a second — it does not interfere with normal operation.

ALLIS-CHALMERS

A-4592

New Rolling Mill

21-in. mill increases range and improves quality of bars offered by Cincinnati producer

POLLAK STEEL CO., Cincinnati, has put into operation rolling mill equipment with a "new look." This installation is the fourth step in a long-range expansion and modernization plan that started in 1947. It increases Pollak's ability to roll a wide variety of products in a number of different ways. Result: A broader product line.

The 21-in., 2-high rolling mill is driven by a 500-hp motor. It was engineerd and built by Continental Foundry & Machine Co., Pittsburgh.

Automation — Steel passing through this mill is moved to a 16-in. mill by powered conveyors and tilting tables—all controlled by two men sitting high above the operation in an air-conditioned pulpit. They control the operation. Almost all sequences are automatically controlled with equipment furnished by Electric Controller & Mfg. Co., Cleveland, and Elliott Co., Pittsburgh.

This is the latest approach by a rail steel mill to integrated steel mill finishing operations, company officials say. It eliminates much hand working.

The equipment, including the roll stand, tilting tables, hydraulic shears, automatic bar turners and table transfers, sits on massive, steel-reinforced, concrete foundations which are 12 ft deep.

Boosts Output of Crucibles

Electro Refractories & Abrasives Corp., Buffalo, increased the capacity of its crucible mix department by 25 per cent to meet growing demands for crucibles. The new facilities feature a different type mixing action, using steam jacketed mixers for better heat control.

National Aircraft Widens Field

Mag-Electric Products Inc., Hawthorne, Calif., has been acquired by National Aircraft Corp., Burbank, Calif., and will be operated at its present location as a wholly owned subsidiary. This purchase marks the further expansion of National Aircraft in the electronic component field and supplements the company's transistor activities in Burbank. Mag-Electric makes magnetic amplifiers, power supplies, delay lines, electronic test equipment and transformers.

Black & Decker Expands Plant

A $3.5-million addition will be built to the Black & Decker Mfg. Co.'s electric tool plant at Hampstead, Md. The new unit, which will contain about 208,000 sq ft and will about double the plant area at Hampstead, should be ready for occupancy by next October.

Doubles Chromium Oxide Output

Geo. B. Smith Chemical Works Inc., Maple Park, Ill., completed an expansion project which will double its chromium oxide production. The company also makes a line of dry colors for the building trades.

Bogue Opens Canadian Plant

Bogue Electric of Canada Ltd., Ottawa, Ont., formally opened new production and administrative headquarters at Gloucester, Ont. The new 80,000-sq-ft plant will manufacture motors, generators, power supplies, control systems and electronic components. The Canadian company is a subsidiary of Bogue Electric Co., Paterson, N. J., whose product line now embraces every branch of electronics, chemistry, thermodynamics, servo-systems, electric power, magnetics and nucleonics.

Hupp Buys Pioneeer Electric

Hupp Corp., Cleveland, acquired Pioneer Electric & Research Corp., Chicago, an electronics firm engaged in manufacturing and research. The business will be conducted as the Pioneer Electronics Division of Hupp, with J. J. McEnerney continuing as president. The acquisition follows the merger agreements negotiated recently by Hupp with Typhoon Air Conditioning Co. and Typhoon Prop-R-Temp Corp. Earlier this year, Hupp negotiated a merger in which Perfection Industries Inc., Cleveland, became the Perfection Industries Division of Hupp.

Heavy Steel Backbone

Heaviest steel reinforcing bars ever to be used in overhead highway construction in California are going into these piers for a San Francisco freeway. More than 1000 tons of 2⅜-in. bars are being produced at Columbia-Geneva Steel Division's Pittsburg, Calif., plant for the project

Beryllium Corp. Diversifies

Beryllium Corp., maker of beryllium metal and alloys, Reading, Pa., acquired Nonotuck Mfg. Co., Holyoke, Mass. Nonotuck is engaged in the drawing, tinning and bunching of wire. This acquisition is part of Baryllium's long-range program to expand and diversify.

Seattle Fabricator Renamed

Puget Sound Sheet Metal Works, Seattle, changed its name to Puget Sound Fabricators Inc., effective Jan. 1. The firm is engaged in the custom fabrication of metals up to 1 in. thick.

Expands Aircraft Parts Plant

Axelson Mfg. Co., division of U. S. Industries Inc., is expanding its aircraft manufacturing facility at Montebello, Calif., representing an investment of more than $1 million. A new, 120,000-sq-ft plant will provide increased manufacturing facilities for aircraft landing

gear and components. It also will permit consolidation of all Axelson aircraft manufacturing activities in one place and will release space in the Vernon (Calif.) headquarters plant which will be devoted exclusively to petroleum and machine tool manufacturing.

Vulcan Expands Facilities

Vulcan Crucible Steel Co., division of H. K. Porter Company Inc., Aliquippa, Pa., tool steel manufacturer, opened a warehouse and sales office at 61 Moulton St., Cambridge, Mass. Steel Specialties Inc., Baltimore, recently was appointed to handle Vulcan sales in that area. A. Wilfred Nelson is district manager in charge of the Cambridge warehouse which will carry a full line of Vulcan tool steels and flat ground stock and drill rod.

Opens Container Plant Addition

American Can Co., New York, formally opened its $2-million addition to its plant at San Francisco. R. C. Stolk, vice president in charge of West Coast operations, says the new construction added 346,000 sq ft to the factory. The plant now has a floor area of more than 800,000 sq ft and is capable of producing 1.5 billion metal and fiber containers annually.

Thor Buys Cincinnati Firm

Thor Power Tool Co., Aurora, Ill., purchased Cincinnati Rubber Mfg. Co., maker of transmission and conveyor belting, hose, gaskets and associated mechanical rubber products. J. F. Joseph will be chairman of the Cincinnati firm; L. P. Darnell, president.

Motor Control Firms To Merge

Stockholders of Square D Co., Detroit, and Electric Controller & Mfg. Co., Cleveland, will act Dec. 28 on a proposal to merge. If approved, F. W. Magin would be chairman of the board; A. Goddon Patterson, president. As the surviving corporation, Square D would become one of the largest manufacturers of electric motor controls in the nation. Square D is planning a $2.5-million addition to its factories in Milwaukee, which constitute its largest manufacturing facility.

Air Conditioning Firms Unite

United States Air Conditioning Corp., Minneapolis, purchased Floral City Heater Co., Monroe, Mich. This marks the entry of the Minneapolis firm into the warm air heating field. It is the latest step in a long-range program of expansion and diversification of the company's manufacturing and marketing operations.

Buys Rochester Warehouse

A group headed by D. G. Baird and Charles Shipman purchased the Rochester warehouse of Follansbee Metals Corp. The group has been identified with the control of Beals, McCarthy & Rogers Inc., a Buffalo steel and industrial supply firm. The Rochester plant provides a warehouse area of 36,000 sq ft.

Forney's Offers Barrett Tools

Forney's Inc., New Castle, Pa., acquired all design, engineering and manufacturing data and patterns for the complete line of Barrett machine tools (Barrett Machine Tool Co., Meadville, Pa.). The material acquired dates from 1900 to present. Forney's Inc. can supply replacement parts for all machines now in use, supply new machines and do complete rebuilding and modernization.

Fenwal Inc. Expanding

Fenwal Inc., Ashland, Mass., manufacturer of temperature control equipment, has leased an additional 100,000 sq ft of production space at Framingham, Mass. The firm is also planning increased facilities at Ashland.

ASSOCIATIONS

Joseph T. Sohn, vice president, Bedford Foundry & Machine Co., Bedford, Ind., was elected president of **Electric Overhead Crane Institute Inc.**, Washington. Other officers elected are: Vice president, H. T. Florence, Cleveland Crane & Engineering Co., Cleveland; Joe H. Peritz, executive secretary and treasurer.

George G. Raymond Jr., president, Raymond Corp., Greene, N. Y., has been elected president of the **Material Handling Institute**

GEORGE G. RAYMOND JR.
. . . MHI president

succeeding R. H. Davies, vice president, Industrial Truck Division, Clark Equipment Co., Buchanan, Mich.

New MHI first vice president is John W. Stiles, president, Island Equipment Corp., Long Island, N. Y.; second vice president is Robert L. Fairbank, general sales, Towmotor Corp., Cleveland.

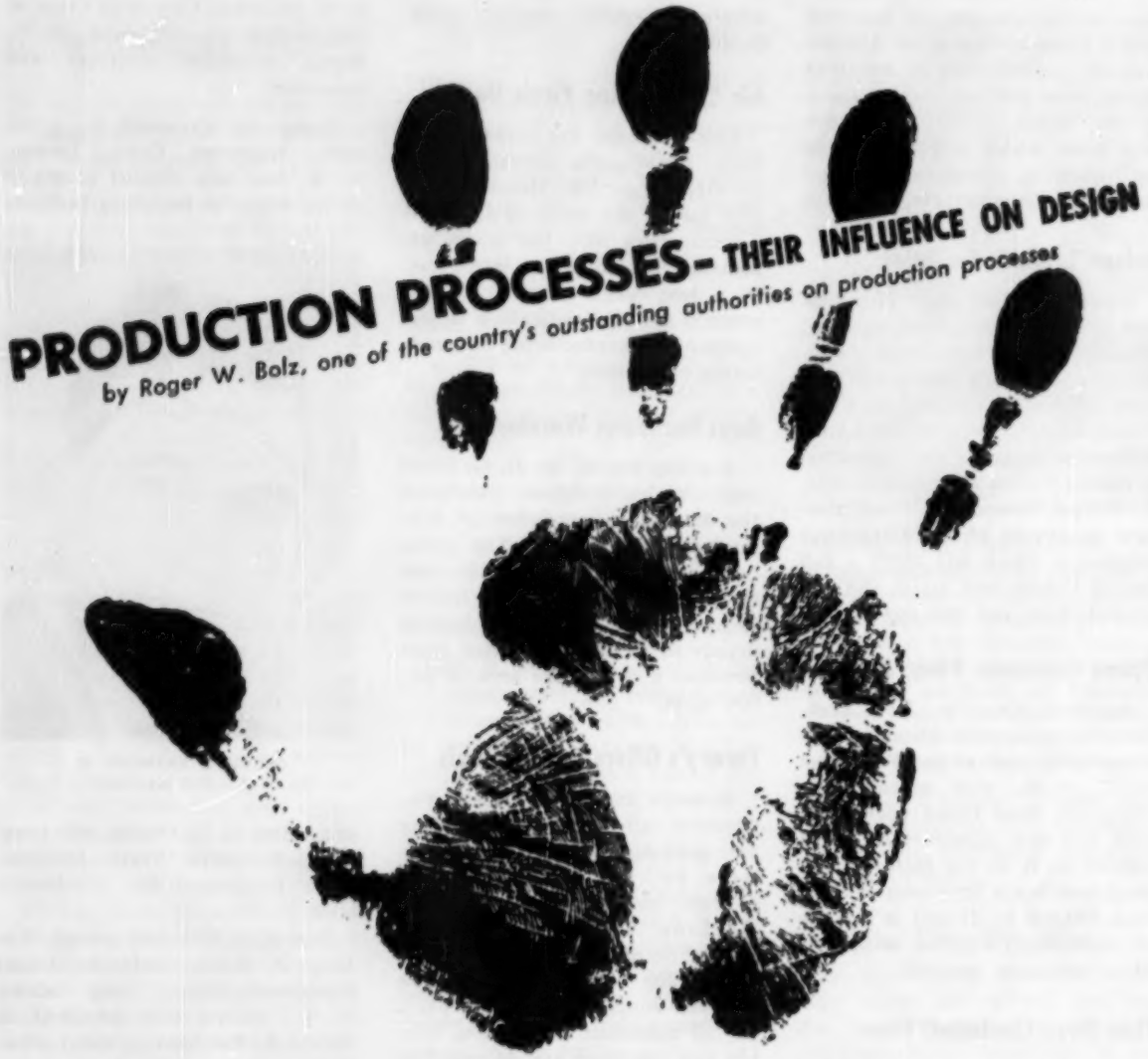
MHI is sponsoring an all-industry exhibition of material handling equipment in Cleveland Public Auditorium June 5-8, 1956.

Power Crane & Shovel Association, New York, elected: President, D. W. Lehti, Link-Belt Speeder Corp., Cedar Rapids, Iowa; vice president, M. B. Garber, Thew Shovel Co., Lorain, O. Herbert S. Blake Jr. is executive secretary of the association.

Eugene D. Mulligan has joined the staff of the **Porcelain Enamel Institute,** Washington. He will fill the newly created position of administrative assistant.

David W. Pettigrew was appointed administrative assistant, **American Zinc Institute,** New York.

TECHNICAL OUTLOOK TECH



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STEEL

December 26, 1955

Technical Outlook

WIRED BY TAPE— The forerunner of machines that will automatically wire electrical circuits on the production line is being shown off by Clevite Corp. It takes its instructions from a punched tape, makes solderless wrapped connection, hooks up two terminals in about 5 seconds and can wire 1600 terminals on a 9½ x 9½-in. board.

FLASHY ALUMINUM— Color anodized and vitreous enameled aluminum diecastings are in the offing, says the American Die Casting Institute. Sandoz Chemical Works Inc., which makes metalfinishing dyestuffs, has announced five lightfast dyes for outdoor use on anodized aluminum: A bright yellow, a brassy yellow, a light blue, a medium blue and a glossy black.

HOT BOND— Two heat-resistant adhesives suitable for structural uses at temperatures as high as 600°F have been developed by North American Aviation Inc. One is especially suited for metal-to-metal bonding. It has a tensile strength of 1600 psi at 500°F when bonding aluminum. Sandwich cores failed at a shear stress of about 200 psi at 500°F.

WELD GUARD— Notch-tough weld deposits made at points where brittle fractures are known to initiate are good insurance against such fractures in structural mild steel, a Naval Research Laboratory investigation concludes.

STRONGER TITANIUM— By rigidizing, titanium sheets are increased in stiffness as much as 155 per cent. This means thinner sheets can be used to give bending strength equivalent to heavier ones, reports Rigidized Metals Corp., Buffalo. The process uses contour rolling to give the metal a design-strengthening, three-dimensional, geometric pattern. Advantages, in addition to more strength: Greater surface area for heat dissipation and better appearance—it conceals scratches and scuffs and eliminates glare. The newest application of rigidized titanium is in Convair's F-102A where weight was reduced and wrinkling and buckling eliminated because of better heat dissipation.

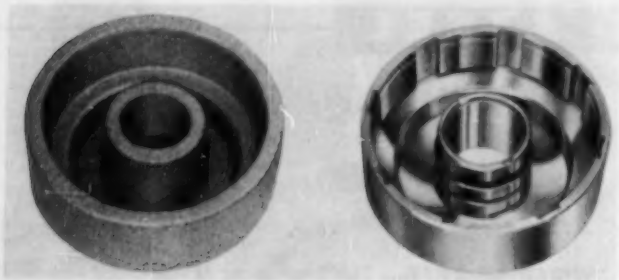
PHOSPHATING CYCLE— A degreaser, plus a four-tank phosphating unit, is the simplest system for putting protective phosphate coatings on steel, according to a study made at Rock Island Arsenal Laboratory. Cleaning methods other than trichlorethylene vapor degreasing may be used, but require additional equipment and may affect formation of the coating, the report (available from OTS) states.

SHOOTING FOR KNOWLEDGE— Aberdeen Proving Ground's ballistics research laboratory has a gun that fires projectiles 11 times faster than the speed of sound. It isn't a tactical weapon; it's a research tool. It will be at the front in the attack on the heat barrier, a critical factor in the design of supersonic aircraft, missiles and outer space vehicles. Hydrogen is the gun's propelling medium.

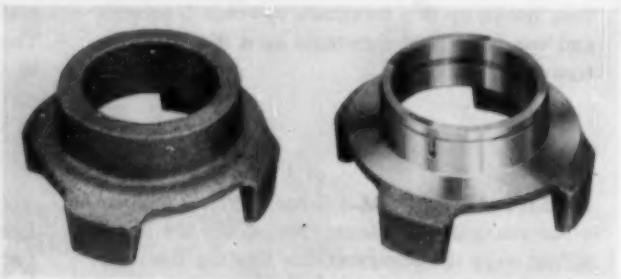
NEW CONTROL— Ferro Corp., Cleveland, has developed a pocket-sized instrument for measuring the iron content in a stainless steel weld. Ferro engineers say: High alloy stainless steel welds may hot crack when put down under conditions of restraint. A small amount of ferrite counteracts this. But the amount of iron should not be so much that the metal is embrittled if it is held for a long time in the ferrite temperature transformation range.

Metalworking Outlook—p. 23 *Market Outlook—p. 79*

Heat Treating To Produce Pearlitic Malleable



Pearlitic malleable casting for automotive-transmission, direct-clutch piston retainer and the machined part. The casting weighs 10.3 lb, has the required strength and is easily machined to an excellent finish



Pearlitic malleable casting for crawler-type-tractor, steering-clutch throw-out sleeve and the machined part. It weighs 5 lb, will withstand heavy stresses and is more economically machined than other materials for this use

By JAMES H. LANSING
Technical and Research Director
Malleable Founders' Society
Cleveland

PEARLITIC MALLEABLE castings have the versatile castability of standard malleable iron, combined with properties approaching those of a good grade steel forging—strength, hardness and wear resistance.

This is because the material contains controlled amounts of combined carbon—generally in the form of pearlite, sorbite or martensite. Combined carbon may range from 0.30 to 0.80 per cent. The strength and hardness generally will vary directly with the carbon content; elongation will vary inversely.

The Material — Both malleable and pearlitic malleable parts are produced from white iron castings. Generally, the chemical analysis of the white iron is identical, although in one production method the manganese content is raised about 0.5 per cent.

The name "pearlitic" comes from "pearlite," which is a microstructural mechanical mixture of ferrite (carbon-free iron) and cementite (carbon combined chemically with iron) in alternate layers.

Properties—Tensile strengths of pearlitic malleable grades range from 65,000 to 100,000 psi; yield strengths go from 45,000 to 80,000 psi; elongation, from 2 to 10 per cent. As produced, the hardness of pearlitic malleable is controlled at various values within a range of 163 to 269 Brinell. (See table on page 61.) It is easily hardened locally to Rc 50 and higher.

Its machinability is better than that of steel forgings of equal indentation hardness. Bearing properties are excellent. (They result from the structure of the metal, its hardness and excellent machine finish.) Wear resistance is illustrated in many uses under heavy loads and at high speeds. Good damping capacity is demonstrated in crankshaft use. Its design adaptability eliminates excessive weight and much machining.

Applications—Pearlitic malleable castings are used in automotive engine rocker arms, automatic transmission parts, shifter forks, cast gears, gear blanks, conveyor chain links, crankshafts, sprockets, diesel engine pistons and machine gun trunnion blocks.

The material responds readily to localized hardening by flame, induction or immersion methods. In uses such as the automotive rocker arm, the excellent bearing surfaces of pearlitic malleable make bushings unnecessary.

Production — There are three ways to make pearlitic malleable irons: 1. Reheating a completely graphitized malleable iron. 2. Arresting graphitization before it is complete. 3. Preventing or retarding second-stage graphitization by adding a suitable alloy, by quenching and tempering or by a combination of alloy and quench.

Reheating Standard Malleable

When malleable iron is reheated above the critical temperature, some of the temper carbon is redissolved (upon cooling it will form carbide). Solution occurs first at the grain boundaries and around the temper carbon nodules. The amount of recombined carbon

can be controlled by the temperature and time of the treatment.

It can be retained in the matrix by a liquid quench or by control of the cooling rate to produce the desired microstructure. If a liquid quench is used, it generally is followed by tempering to form a spheroidized cementite structure.

Procedure — Standard malleable iron castings are reheated to a temperature ranging from 1475 to 1550°F. Treatment at the higher temperature will give parts with high strength and hardness. The lower temperature gives a tougher, more ductile material with less hardness.

Following a through heating and oil quench, the castings are reheated and drawn at 1150 to 1300°F. The higher the temperature, the lower the hardness; the lower the temperature, the higher the retained hardness. A through heating (similar to the first reheat treatment) followed by cooling at room temperature is adequate.

Properties—Compositions which normally produce standard malleable with high elongation also produce pearlitic malleable with high elongation. Compositions which normaly produce malleable of lower elongation also produce pearlitic malleable of lower elongation.

From material of relatively high elongation, a treatment, such as reheat at 1475°F, oil quench and draw at 1250°F, produces a pearlitic malleable whose properties are: Ultimate strength, 75,000 psi; yield point, 50,000 psi; elongation, 12 per cent in 2 in.; Brinell hardness, 192. (For microstructure, see Fig. 1 at X100 on page 62.)

When the cycle is, reheat at 1550°F, oil quench, draw at 1250°F, the material has higher strength, higher hardness and lower ductility. Ultimate strength is 82,500 psi; yield point, 62,500 psi; elongation, 4 per cent in 2 in.; Brinell hardness, 216. (For microstructure, see Fig. 2 at X100.)

Equipment — For the 1475 or 1550°F treatment, a gas-fired pit-type, high-temperature soaking furnace with refractory lining is satisfactory. A conventional oil-quench tank is used. The same furnace may be used for tempering the castings.

For production purposes, it may be desirable to use a low-temperature draw furnace for tempering. The refractory lining is not required because of the lower temperature.

Arresting Graphitization

This is done by reducing, or virtually eliminating, the second-stage graphitization normally used to produce standard malleable. At the end of first-stage malleableization, all the massive cementite has been decomposed and the structure consists of austenite and temper carbon nodules. If the metal is then taken through the critical range at a drastically high cooling rate (liquid quench), the structure will be martensitic. It will be wear resistant, hard and fairly brittle. A metal with a martensitic matrix can be tempered to any lesser degree of hardness desired.

If the cooling rate is rapid (400°F an hour), the matrix of the metal will be pearlitic or sorbitic. If the metal is cooled more slowly, coarse pearlite will result. Pearlitic matrices may be spheroidized by reheating. (Spheroidal structures consist of round particles or spheroids of carbide in a ferritic matrix, instead of lamellar pearlite composed of alternate layers of ferrite and carbide. The spheroidal structures have improved ductility, especially as compared with coarse lamellar pearlite.)

Heat Cycles—Pearlitic malleable made by arresting graphitization may be produced in continuous or batch, gas-fired, radiant-tube furnaces, or in continuous or batch electric furnaces.

After quenching, they may be reheated in a continuous furnace or a pit-type furnace. The time and temperature depends on the result wanted. For example, 3 hours just under 1300°F, followed by discharge into the atmosphere may produce material of these tensile properties: Ultimate strength, 80,000 psi; yield point, 55,000 psi; elongation, 5 per cent in 2 in.; Brinell hardness, 223. (For microstructure, see Fig. 3 at X750.)

For Tougher Metal—If a lower hardness, slightly tougher material is wanted, it can be obtained by extending the tempering time to 6 hours. Properties then might be: Ultimate strength, 75,000 psi; yield point, 52,500 psi; elongation, 7 per cent in 2 in.; Brinell hardness, 187.

Pearlitic malleable also may be produced following arrested graphitization by re-heating to 1500°F, oil quenching, then tempering for several hours just under 1300°F. Properties may be: Ultimate strength, 82,500 psi; yield point, 62,500 psi; elongation, 6 per cent in 2 in.; Brinell hardness, 229.

For Harder Metal—Another example of reheat-treatment of the arrested graphitization product is obtained by reheating to 1600°F, oil quenching and tempering for a few hours at just over 1200°F. Properties obtainable are: Ultimate strength, 100,000 psi; yield point, 80,000 psi; elongation, 2.5 per cent in 2 in.; hardness, 261 Bhn.

Alloying

The most common alloying element is manganese; from 0.50 to 0.80 per cent is added. Its purpose is to stabilize the secondary carbides during heat treatments. It also promotes depth of harden-

Properties of ASTM Standard Specification A 220-55T

Grade No.	Ultimate Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2 in.	*Brinell Hardness
45010	65,000	45,000	10	163-207
45007	68,000	45,000	7	163-217
48004	70,000	48,000	4	163-228
50007	75,000	50,000	7	179-228
53004	80,000	53,000	4	197-241
60003	80,000	60,000	3	197-255
80002	100,000	80,000	2	241-269

*Hardness is not a specification requirement. Typical ranges are listed for the grades.

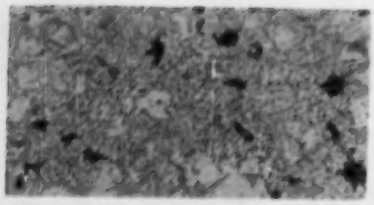


Fig. 1—Reheated malleable material with high elongation

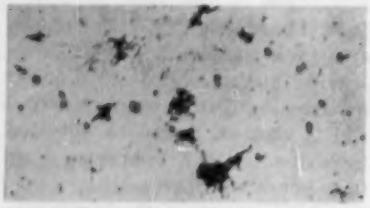


Fig. 2—Reheated malleable material with high strength and hardness

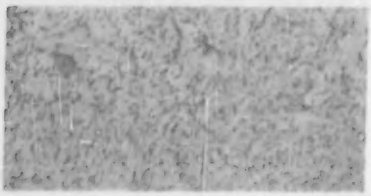


Fig. 3—Arrested graphitization material with high strength and hardness

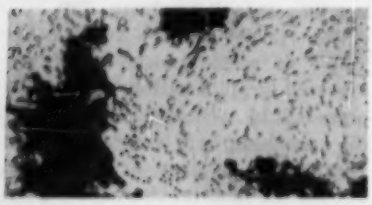


Fig. 4—Alloyed material with high elongation

Fig. 5—Alloyed material with high strength and hardness

ing and uniformity of structure on quenching. Total manganese varies from 0.85 to 1.10 per cent, depending on the properties desired. Manganese slows up second - stage graphitization. It prevents graphitization from going to completion while the pearlitic matrix is being spheroidized.

Manganese alloying is effective in a cycle which will also produce standard malleable, provided the castings are cooled rapidly through the critical temperature following first-stage graphitization. They are then reheated for the second stage of standard malleable, or spheroidizing of the pearlite of pearlitic malleable.

Equipment—Most pearlitic malleable of this type is produced in electric furnaces. They permit a relatively rapid air quench by lowering the car from the furnace on completion of the first stage of the malleable anneal. Radiant-tube, batch or continuous furnaces may be used.

In the case of the electric, elevator-type furnace, when the first (high temperature) stage of the anneal has been completed, the car is dropped and the load cooled in moving air to about 1200°F. The car of castings is placed in a furnace having a substantially lower temperature. Here the castings are held for 20 to 30 hours at just over 1300°F.

Properties—The castings, if of a composition which normally would produce malleable of relatively high elongation, might have these values: Ultimate strength, 75,000 psi; yield point, 50,000 psi; elongation, 12 per cent in 2 in.; Brinell hardness, 192. (Fig. 4 shows microstructure at X500.)

One cycle to produce such pearlitic malleable from 0.85 to 0.90 per cent manganese iron is as follows: Heat to 1720°F in 8 hours, hold at 1720°F for 28 hours, drop the loaded car and quench with moving air to 1230°F in 2 hours; reheat to just over 1300°F and spheroidize for 34 hours. Total time is 72 hours. Standard malleable castings may be annealed in this cycle.

For Higher Strength—To produce a higher-strength, harder iron, manganese may be increased to 1.00 or 1.10 per cent—using the above cycle and a base material composition which would normally produce relatively high elongation malleable. (The microstructure is shown in Fig. 5 at X500.) Properties obtainable are: Ultimate strength, 85,000 psi; yield point, 60,000 psi; elongation, 6 per cent in 2 in.; Brinell hardness, 229.

With another, shorter treatment and a material of a slightly different chemical composition, a pearlitic malleable type would be produced with these properties: Ultimate strength, 70,000 psi; yield point, 50,000 psi; elongation, 4 per cent in 2 in.; Brinell hardness, 197.

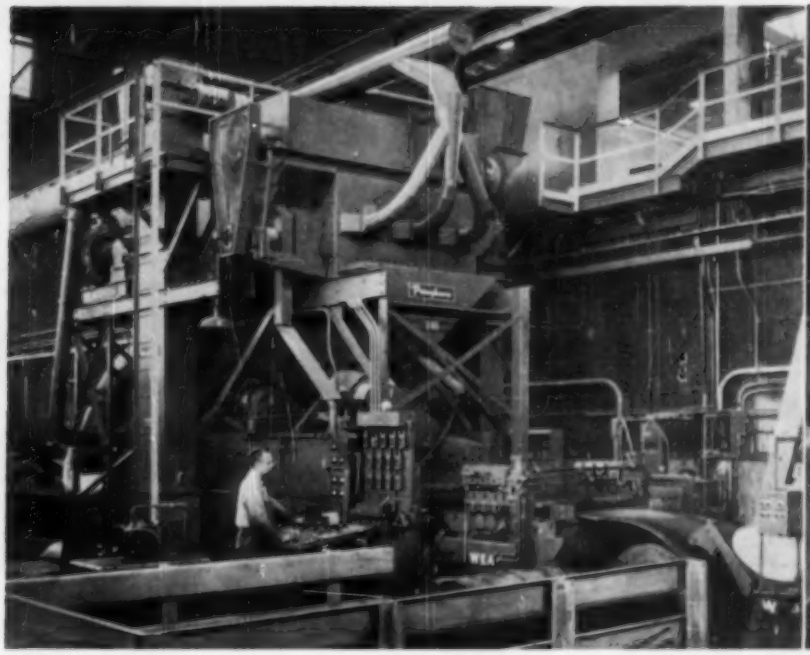
Selective Hardening — Pearlitic malleable of 197 Bhn and higher is especially adaptive to selective hardening. Castings for this purpose may be made by any of the standard methods. When pearlitic malleables are being produced for localized hardening, it is possible to regulate the production method to assure material which will be satisfactory for the subsequent treatment. For example, in the case of re-heat-treated pearlitic malleables, the operation is conducted at a slightly higher temperature than when the aim is for a lower indentation hardness and maximum elongation.

Excellent results have been obtained in producing a minimum of 50 Rockwell C to a 1/16-in. case depth by both induction and flame hardening.

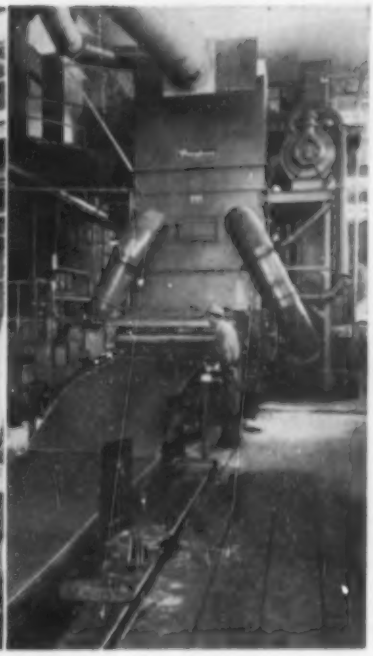
Localized hardening also may be done by immersing pearlitic malleables in a lead or salt bath at a temperature of 1600 to 1625°F. Hardness of 50 Rockwell C minimum may be attained by immersing 163 to 207 material for about 5 minutes, followed by an oil quench. When parts are in the 197-241 range, immersion of 2½ or 3 minutes is adequate. Although lower original hardness material requires about 2 additional minutes for the hardening treatment, it may be more economically machined before hardening.

Uses—As was earlier noted, an example of the use of localized hardening with pearlitic malleable castings is the automotive rocker arm. The pad is hardened for wear resistance. It's used without a bronze bushing, effecting a substantial saving in manufacture. Other applications in which localized hardening is used: Crankshafts, transmission shifter yokes, truck crankshaft sprockets, trolley wheels, gears and sprockets.

• Extra copies of this article and the article on standard malleable which appeared last week are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



Descaling unit is at head of automated shearing, leveling and lubricating line. One man at control pulpit handles all variables in blast cleaning



Both sheets and coils can be cleaned in the blasting unit

Blast Cleaning Automates Shearing Line

Parish Pressed Steel replaced the pickling tank in its processing line with a blast descaling unit. It made possible automated cutting, lubricating and stacking

AN AUTOMATED cleaning and cutting line, utilizing a blast descaling unit instead of an acid pickle, is saving Parish Pressed Steel Division of Dana Corp., Reading, Pa., $3 on every ton of steel it buys.

With pickling, there was little alternative but to buy steel in sheets cut to size by the mill. This cost $3 a ton extra. Parish now buys hot-rolled strip in 23,000-lb coils. Feeding, blast cleaning, lubricating and cutting to size is a continuous, straightline operation.

Production—The coils are fed into the blast cabinet from a Wean uncoiler. Line speed is about 150 fpm when feeding 36-in. strip—an hourly rate of 50 tons. Sheet 48-in. wide travels at 100 fpm; and 60-in. sheet runs at 80 fpm.

In the blast cabinet, both sides of coils or sheets are cleaned in one pass. Eight blasting wheels throw 400,000 lb of steel shot an hour in a calculated pattern. The pattern can be changed for different widths of strip by shifting the wheels.

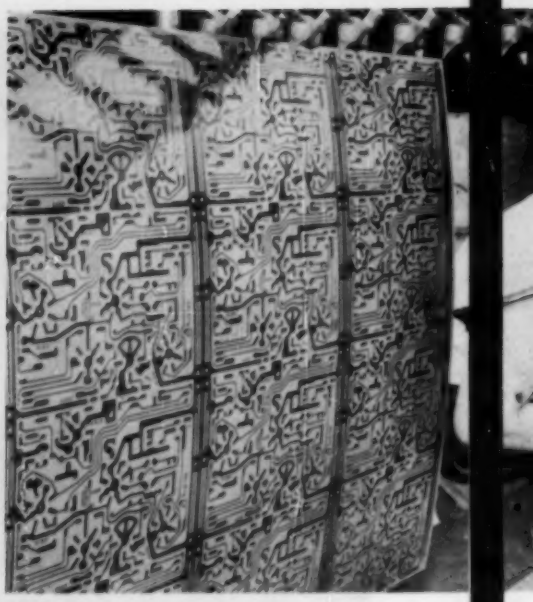
Easily Stacked—After blasting, sheet or coil is cut to length, leveled and sprayed on both sides with a special lubricant. This prevents rusting, reduces die wear and promotes good paint adhesion.

The cut sheets are assembled in packs ready for forming and assembling into auto frames and other sheet metal products.

Versatile—Although the descaling and shearing line is designed to handle strip in coils, the feeding device also can handle sheets. Sheets 40 ft x 48 in. are fed manually to the descaler; sheets 20 ft x 60 in. are fed automatically. A roller conveyor which is raised out of the way when feeding coiled strip, provides a bridge from the plate conveyor to the descaler.

Blast cleaning eliminates acid pickling and its attendant problems—fumes, pH control and disposal of pickling acids. Space saving is considerable. The cleaning cabinet is an integral part of the processing line. Parish's descaling unit was built by Pangborn Corp., Hagerstown, Md.

1. Large drawing of the circuit is reduced by photography, and the negative is printed in much the same manner as a snapshot. The "paper" is an aluminated plastic sheet, one side of which is covered with thin copper foil



2. Printed sheets, 12 circuits to each, are inspected and retouched where necessary

TV Automation Lowers Costs, Makes Jobs

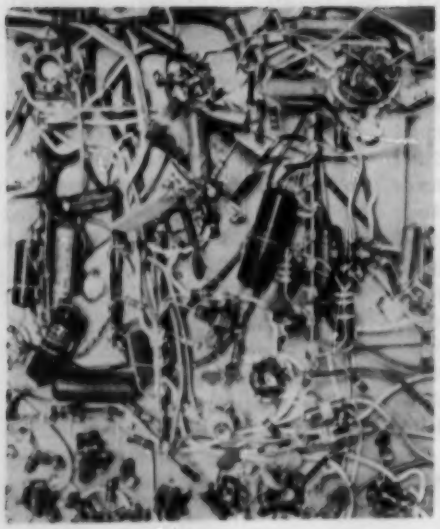
AUTOMATION, that overworked word on which some labor leaders are trying to tie an ominous label, accomplished three things at Admiral Corp., Chicago: 1. Production went up. 2. Employment went up. 3. Costs went down.

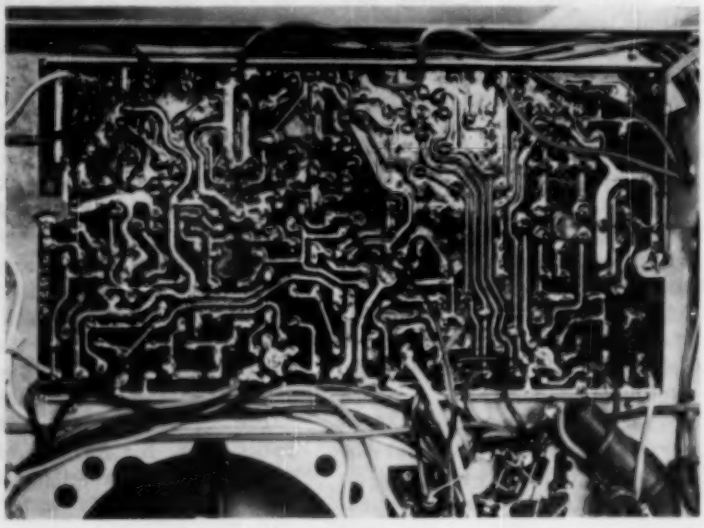
Instead of displacing personnel, automated production lines boosted output to the point where more help had to be added.

In addition, substantial savings realized through the new lines brightened the retail picture. Cost to the consumer of Admiral TV sets now is less than 60 cents per square inch of viewing space; in 1947 it was ten times that.

Step by Step—The pictures on these pages show how Admiral's use of automation and printed circuits produces half a TV chassis in a matter of seconds. Pictured is the first line, known affection-

7. The old and the new. Printed circuit, which eliminates much of spaghettilike maze of wire circuits is the key to success in automatic assembly

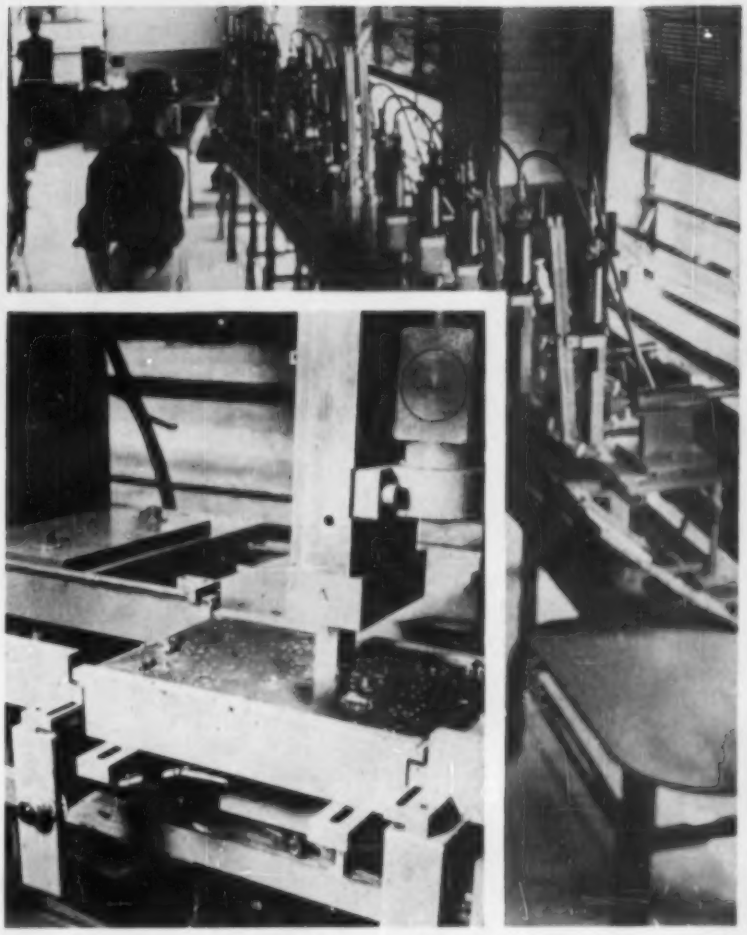




Acid etching follows. It eats away all the copper foil except for the printed circuits

ately by the employees as Robot I. Robot II now is in operation, too. It inserts tube sockets and condensers.

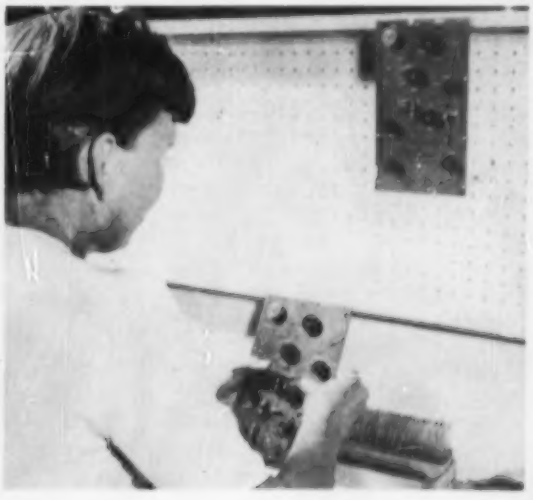
Some advantages of the lines: More uniform production by elimination of human error, trouble-free soldering, greater resistance of sets to extremes of temperature and humidity, more engineering flexibility and one-shot testing, which eliminates 25 to 30 checks.

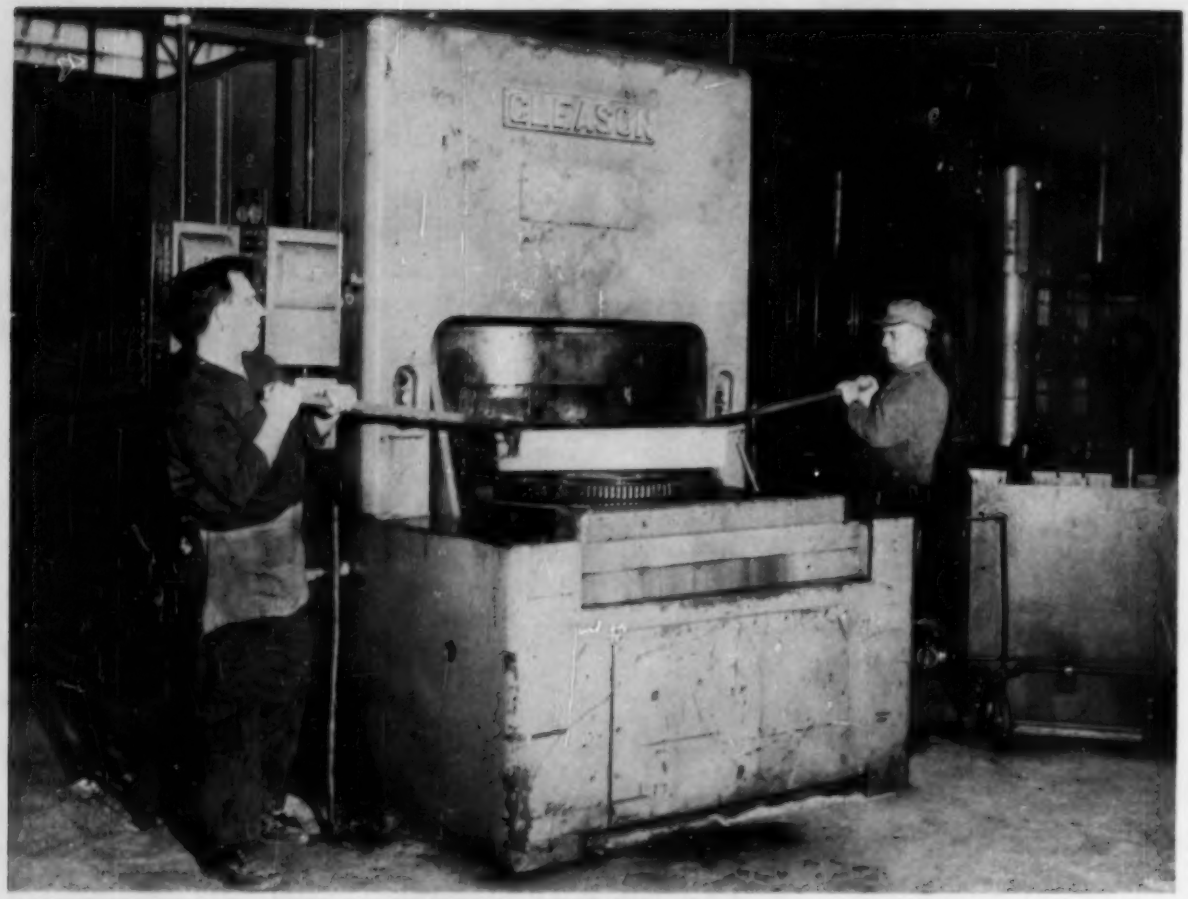


3. Sheets are cut into individual boards, punched and placed on the automatic line. Machines resembling air-powered staplers install resistors and other components. 4. Machine installs a resistor. Light in lower left is a signal: If a component fails to feed properly, the entire line stops, and a light goes on at the station where the trouble lies

6. After 69 resistors, condensers, coils, tubes, sockets and other components are mounted, underside of the board is dipped in solder to connect leads to the printed circuit

5. Final assembly of components and insertion of tubes is by hand. Second automatic line, now in operation, installs such components as tube sockets and condensers





Quenching presses hold distortion to a minimum. Operators here are positioning a heated ring on the lower die which moves automatically back into position under the top die. Holding, quenching and cycle time are automatic and adjustable

Rings Truer with Quench Press

By ARTHUR G. PORTZ
Chief Metallurgist
Cleveland Welding Co.
Subsidiary, American Machine & Foundry Co.

STRESS in a turbojet engine is severe compared with that in an automobile engine. Combustion is continuous. Operating temperatures are high. High gas velocities cause metal erosion.

Inside temperatures range as high as 1800°F while exhaust air rockets from the tail pipe at over 2500 fps. Internal pressures are high, too—as much as 60 psi in some sections near the intake.

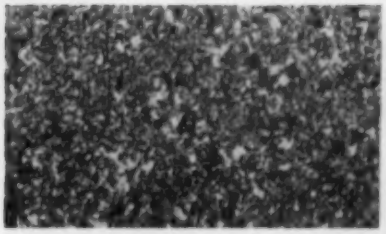
To absorb the terrific punishment, compressor blade retainer rings for jet engines must be as strong and tough as steel can be made. Fabricating and heat treating must be designed to produce such parts at a reasonable cost.

Materials—At Cleveland Welding, we use various alloys, plus austenitic, martensitic and ferritic stainless steels. Let's take a typical example to show you how it's done.

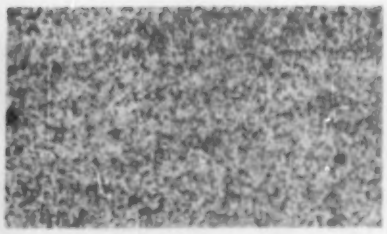
The table shows step-by-step processing for a ring made from E 4337. Rings are rolled from bar stock into diameters ranging from 7 to 40 in.

Heat Treatment—After welding, testing and cold stretching to size, the rings are normalized in a Surface Combustion, direct-fired, horizontal-hearth furnace. Fork trucks load and unload stock. Cooling takes place at room temperatures.

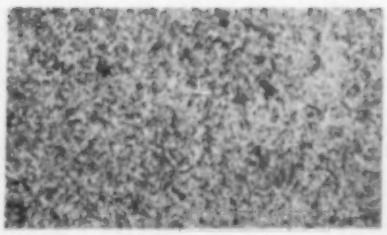
A direct-fired, gas furnace of the continuous chain type hardens the rings at 1600°F. Here, quenching proved to be the biggest problem. On the larger rings, we encountered warping of over ¼-in and out of roundness up to ½-in. A Gleason quenching press re-



E4337 Normalized (Picral Etch, X100)



E4337 Quenched (Picral Etch, X100)



E4337 Draw RC 30-34 (Picral Etch, X100)

duced warp to below 1/16-in. and out of roundness to ⅛-in. (total indicator). Dimensional rejects are a thing of the past.

Parts are next tempered in pit-type, Surface Combustion, forced convection furnaces.

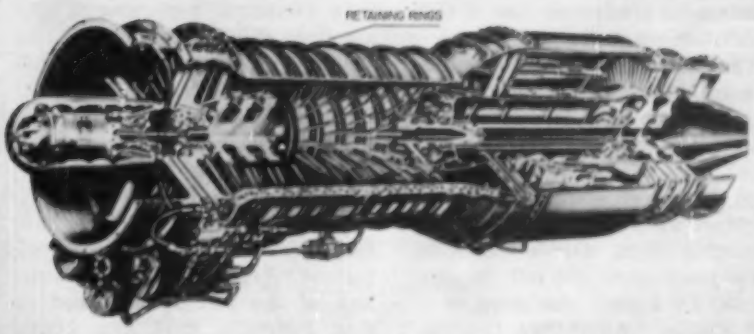
Temperature changes are made quickly and easily by operating a single valve—useful for quick production changes to accommodate varying heats of steel. The majority of our tempering is carried out in the 1100-1200°F range, using 2-to-6-hour cycles.

Rigid Specifications—The metallurgical laboratory works closely with quality control and production at all stages, including heat treatment. As the steel is received, a check analysis is made and a code letter assigned. The code is stamped on each bar before it is used. A cross reference of the code letter and the corresponding mill heat number is made on the certification furnished with each shipment of rings.

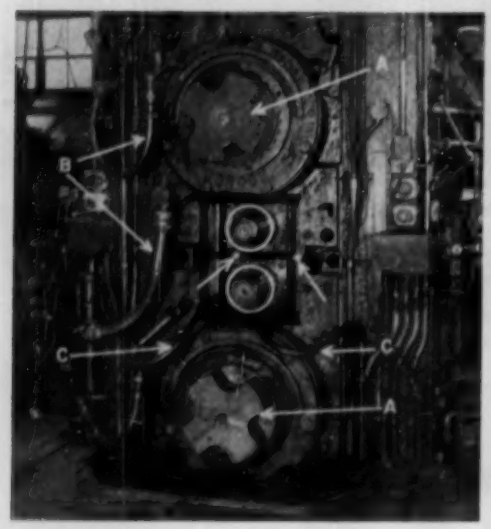
Quality Control checks welds by x-raying a percentage of the finished rings on a statistical basis. Specifications for E 4337 rings require a hardness of Rockwell C 30-34. Hardness and certain other characteristics are checked 100 per cent.

Forming a Ring from E 4337 Bar Stock

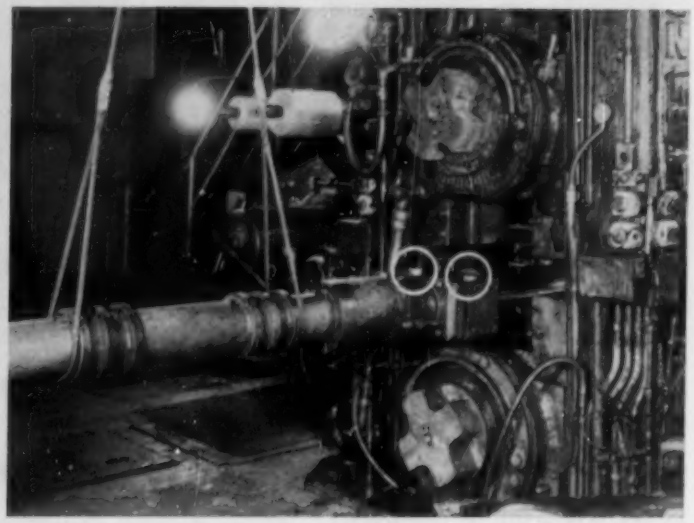
Operation	Equipment
1. Form	Three-roll forming machine
2. Bump flat	Press aligns ends for welder
3. Weld	Automatic welding machine
4. Remove flash	Grinder
5. Size cold—expand min of 1% of circumference	Bulldozer or expander with segmented dies
6. Flatten	Hydraulic press
7. Normalize at 1700° F	Fired gas furnace
8. One hour air cool	Room atmosphere
9. Harden. Heat to 1600° F, hold for 15 minutes	Continuous chain, direct fired, gas furnace
10. Quench in oil	Quench press
11. Draw at 1145° F for 2 hours	Pit-type, forced convection, gas furnace
12. Clean	Shotblast
13. Machine	
14. Inspect	Check for dimensions, surface defects and welds



A typical 10,000-hp jet engine may contain 140 compressor blade retainer rings from 7 to 40 in. in diameter



A—heavy back-up rolls. B—fluid lines to cool and lubricate back-up roll bearings. C—hydraulic lines to lifting jacks. Circles—ends of work rolls



Removing lower roll. Roll extractor fits snugly over splined end of work roll and crane moves roll and its chucks (bearing blocks) out of mill stand. Hydraulic lifting jacks (circles) project from roll chuck

Snap-On Couplings Cut Mill Down Time

Rolling stainless to a mirror finish requires frequent roll change. Bottleneck in this operation is disconnecting and connecting fluid lines to the rolls

DOWN TIME for roll change in modern strip rolling mills is costly. At Crucible Steel Co., Midland, Pa., each minute of down time on a single-stand reducing mill means a maximum production loss of 800 ft of stainless sheet.

The Midland mill rolls stainless to a mirror finish, so it can be used directly as automobile trim, mirror frames and other decorative parts. Work rolls have to be changed as soon as the roll surface shows the slightest deterioration due to wear. Changing from narrow to wide strip production and roll damage caused by a spall also requires a roll change. Altogether, Crucible finds that the work rolls in its 55-in., 4-high reducing mill generally have to be changed about twice every 8-hour shift.

Trouble Spot—To keep down time to a minimum, replacement rolls are kept alongside each mill and the mills are designed to make roll change as rapid as possible. However, one difficulty often bogs down the whole operation—the coupling and uncoupling of fluid lines connected to the rolls.

Fluid lines connect to the mill rolls to provide lubricant for cooling and lubricating the larger bearings of the back-up rolls and to feed hydraulic fluid into lifting jacks which raise the upper set of work rolls when a large clearance is needed (as when feeding a new strip into the mill).

Bottleneck—The fluid lines connect to pipe fittings projecting from the bearing blocks. At Crucible, these fluid lines were originally connected to the roll blocks by threaded fittings which had to be reconnected when a new roll was installed.

This proved to be the bottleneck in the roll changing operation because the cramped space and surrounding projections made it difficult to use a wrench. This was especially the case with the fit-

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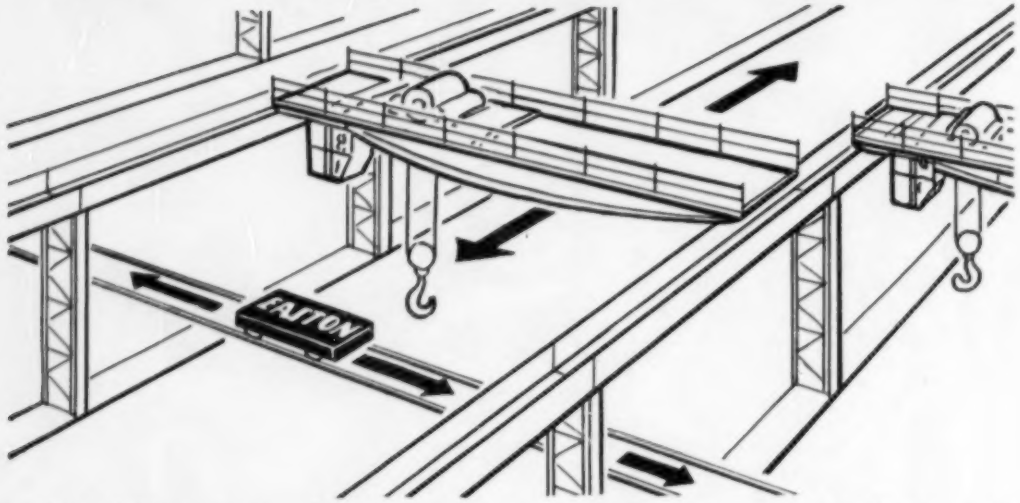


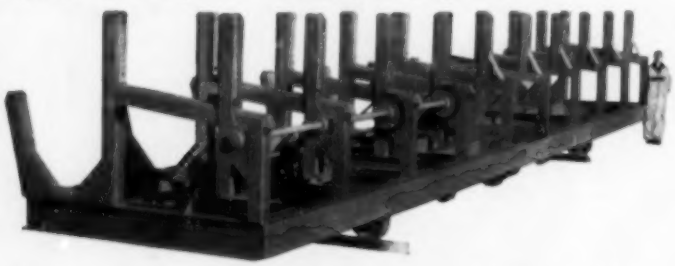
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.



IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

Annealing Furnace Cars	Motor Driven Cars	Scoop Cars
Coal Charging Cars	Newsprint Cars	Skip Cars
Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
Hopper Cars	Rack Cars	Transformer Cars
Mine Cars	Rocker Dump Cars	Turntables

FORTY-ONE YEARS OF DEPENDABLE SERVICE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL TRANSPORTATION EQUIPMENT

EASTON®

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

tings on the back ends of the rolls which required men to work in the cramped space between the mill stand and the wall.

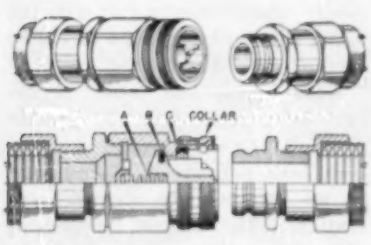
Furthermore, the hydraulic fluid lines for the lifting jacks carry oil at 850 psi; the threaded fittings for these lines have to be extremely tight to make them leakproof. Despite good mill design and expert crews, the company found that the connecting and disconnecting of the threaded pipe fittings accounted for more down time than the entire period (about 20 minutes) required by a skilled crew for the rest of the roll changing operation.

Answer—To eliminate this time loss, Crucible went to quick-connect and disconnect couplings made by Titeflex Inc., Springfield, Mass. These couplings met all the practical requirements of rolling mill operation. Crucible found they reduced roll change time to the bare minimum required for removal and replaceemnt of rolls.

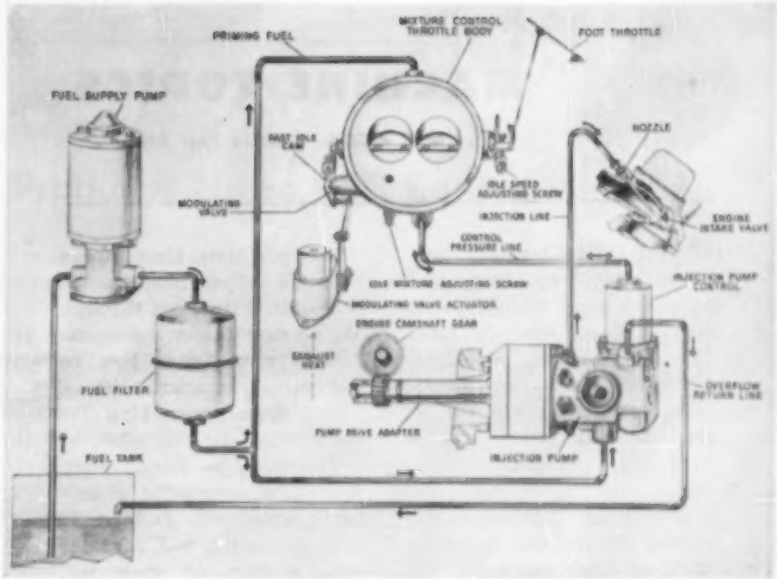
How It Works—The coupling has a ring seal which abuts against the nipple when it is closed, making a tight seal as soon as the coupling is connected. When fluid pressure is in the line, it expands the lips of the seal, making the coupling leakproof at high pressures.

It also has a built-in check valve in each of its two parts. The check valves are opened and permit full flow when the coupling is connected. Disconnecting the coupling automatically snaps the check valve closed in each part, instantly closing both ends of the disconnected lines.

Since installation of the new couplings, down time has become a constant factor that can be counted on in production scheduling—not a variable depending on a man's handiness with a wrench.



Quick-Seal check-valve coupling. A—spring. B—check valve. C—ring seal



Fuel injection for modified gasoline engines uses these parts. The heat control operates like an automatic choke to enrich the fuel-air mixture for cold engines. Spark plugs are still needed

No More Carburetors?

"MORE horsepower, better acceleration and improved economy," are the claims for American Bosch Arma Corp.'s gasoline injection system. Expected to replace carburetors on gasoline engines, the Bosch system can be used now on modified engines of current design.

Suppliers should look for a run on fuel lines when Detroit gives the "go" sign (there is one fuel line for each cylinder). More electrical fuel pumps, gasoline filters and injection nozzles will be used. Demands for injector and metering and fuel pump bodies probably will offset some of the losses in carburetor diecastings.

System — Gasoline injection is unlike a carburetor in any of its many modern versions. Gasoline is injected into the manifold of an engine either just ahead of the intake valve or directly into the cylinder.

Adding the fuel directly at each cylinder eliminates uneven mixtures, a disadvantage of manifolds and carburetors. Better distribution of fuel makes for improved performance.

The Bosch system uses a small, simplified fuel metering system and injection pump, a mixture (fuel - to - air - ratio) control, an electrically driven fuel pump, injection discharge lines, nozzles and a fuel filter. The pump delivers fuel at a pressure that won't cause vapor locks. The filter lasts about 30,000 normal driving miles and takes out foreign particles down to 2 microns.

Price Tag—Initially, gasoline injection will be more expensive than ordinary carburetion, although some four-barrel jobs run nearly as much. As engines become designed for fuel injection, costs will be cut, perhaps even eliminating the differential.

More important, automobiles will be able to use lower—and cheaper—grades of fuel. Other advantages claimed are better engine performance, improved cold weather starting, less engine wear and smoother idling.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

IF YOU like machine tool prices the way they are, there's a good chance you'll be happy all through 1956. Fred H. Chapin, president, National Acme Co., Cleveland, thinks there won't be any general price change next year. Other builders agree.

Boosts in 1955 were designed to offset increased costs of labor and materials. New models came out for the September show with the new prices on them.

Despite the 1955 increases, machine tool prices still lag behind the average. In STEEL, May 30, they were reported to have risen 20 per cent less than the average. That gap was narrowed, but not closed, this year. Still, builders feel 1956 is not the year for catching up.

Deliveries — Backlogs, too, should hold to their present level of about six months—may even drop off slightly. Mr. Chapin says his company is working with a ten-month backlog. He'd rather have it between six and eight months.

Automation Bonus

Standardization, a move that began as an economy measure for builders of transfer machines, may wind up as more of a boon to users.

Standard bases, columns, beds, etc., give the user longer machine potential, more flexibility and shorter delivery time.

Howard N. Maynard, president, Snyder Tool & Engineering Co., Detroit, thinks delivery is important.

Delivery time already has been cut by as much as 50 per cent. Prints get through engineering faster, since engineers now figure how to customize standard items. They have something to start with.

Flexibility — Each work station is considered a separate machine. Instead of ordering a tailored base for each station or each machine, the builder can have them made up in advance, and in any amount.

Potential—When the part that goes through the machine is changed, stations can be altered, moved, added or removed with a minimum of fuss. The too-quick obsolescence of single-purpose machines is partially whipped.

The new concept sails under about as many names as there are builders. Snyder calls it segmented automation.

Ceramic Tools

The key to machining with ceramic cutting tools may lie in the design of a tool holder.

In a recent announcement, W. M. Wheildon of Norton Co.'s research and development department said the holder must "take advantage of those properties of ceramics . . . such as hardness, high-temperature strength and wear-resistance, while minimizing their weaknesses . . . such as low-temperature tensile strength, ductility and thermal shock resistance."

Requirements are: Good support, well-distributed clamping forces and minimum overhang. A mechanical chip breaker is recommended.

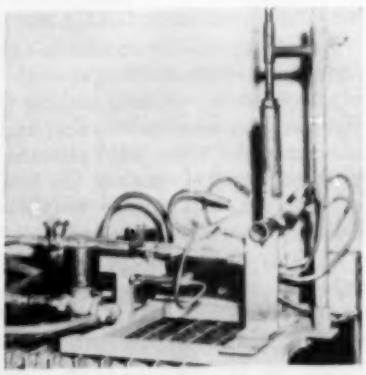
Inside Brazing

A NEW IDEA in brazing tubing assemblies puts the brazing metal inside the joint. Bronze beads furnish the metal, and acetylene picks up the flux. A standard acetylene torch with an adapter supplies the heat.

Idea—Secret of the inside brazing technique is the flux bearing flame. Acetylene first passes through a Gasfluxer which adds the flux to the gas. A special, six-tip "octopus" directs the flame toward all sides of the joint.

The operator places additional flux and the filler metal beads inside the tube next to the joint. Heat is applied, and the operator cuts it as soon as brazing metal appears in the seam.

Result: A clean joint that is ready for final operations. It saves brushing or grinding before finishing.



This T-joint is brazed from within. The six-pointed adapter attaches to a standard acetylene torch

Brazing Metal—Ordinary, ⅛-in. bronze rod is run through a cold header to produce uniformly round beads. A measuring scoop holds the exact number of beads required for the joint. It doesn't matter whether the beads are evenly distributed around the joint; capillarity and the flux take care of even distribution.

Advantages—The most important advantages are: 1. Greater speed. 2. Higher strength. 3. Freedom from porosity. 4. Elimination of an intermediate cleaning operation. The fastest production with this unit is obtained by mounting two units on a grating.

Compact Bodymaker Produces Up to 450 Cans a Minute

Cans from 2⅜ to 5⅛-in. tall and from 2-1/16 to 4¼-in. in diameter are made by this bodymaker. Can sizes may be changed quickly and easily.

The worktable has knurling, notching, edging and prefluxing attachments, but no idle station.

A single-station, double-action edger is driven by a short eccentric which contributes to the speed.

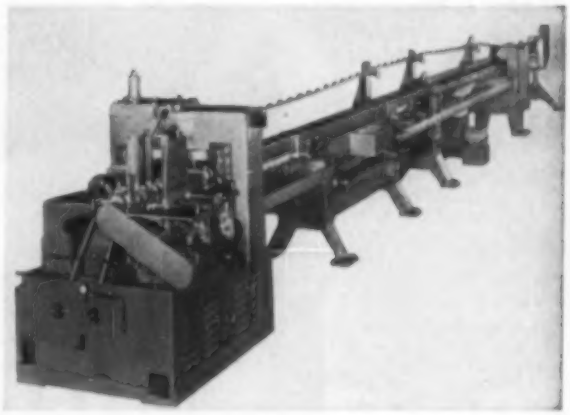
The forming horn is stationary to permit perfect alignment with the solder attachment.

A cam-actuated overhead blank lock prevents movement in the forming station and assures a well-rounded can.

Notching chips are removed by compressed air to prevent their jamming the carbide dies or getting into machinery.

Short-stroke, short-length cranks and eccentrics give smooth operation at high speed.

The water-cooled attachment is the outside horse type and has an overhead can carrier chain provided with guards.



A take-off on the main motor powers the solder attachment. *Write*: E. W. Bliss Co., Canton, O. *Phone*: 7-3421

Tooling Attachment Cuts Tool Change Time to Seconds

Any combination or sequence of turning, boring, facing, chamfering, grooving, necking, threading, knurling, indicating or cutting off can be done with this tool.

It consists of a precision-made tool block (which fits directly on the compound rest of 10-in. manufacturing and toolmaker's lathes) and seven precision-ground and precalibrated tool holders.

Changing from one tool to another is fast and simple; the attachment's tool holders position themselves automatically when slipped onto a locating pin and swung downward into a special slot in the tool block.

No alignment or clamping of the tools into position is necessary; the precise fit of the tool holders in the tool block insures rigidity and accuracy.

The attachment is particularly valuable when a wide variety of different turning operations are performed, as in toolrooms and instrument shops.

Lengthy turret setups and lost time in tool changes are eliminated. Positioning and response are more accurate than with a conventional turret.

The seven tool holders in the set include:

1. Three turning tool holders which can be set up with standard turning, facing, grooving, threading or necking tools.

2. One universal-type tool holder for boring tools or bars and regular turning tools.

3. A holder specifically for cutoff tools.

4. A knurling tool holder complete with knurling tool and wheels.

5. A holder for mounting dial indicators and a standard dial indicator reading in ten thousandths of an inch.

A special rack holds all the tools and mounts on the lathe. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.

This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counter-balanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.

Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.

Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc.

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.

Above container is built with cast iron liner. The holes in outer wall are for cooling.

Here is one of several special drop bottom type containers equipped with couplers and ball bearing trucks for operation in train on rails.

THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS

so many plants find the indispensable...

Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.

This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.

Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.

This is a master container with three 2 cu. yd. insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

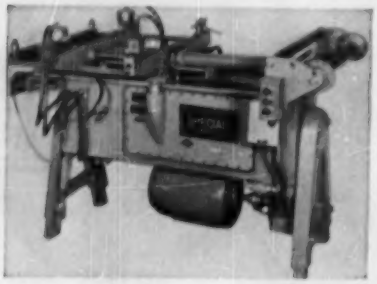
6125 DEMPSTER BLDG., KNOXVILLE 17, TENNESSEE

NEW PRODUCTS and equipment

Punch Press Feeder

Coiled stock is fed automatically by this hydraulic, gripper-type feeder.

All models are adjustable to take narrow-width stock and for infinite feed stroke lengths up to 36 in. Stock up to 36 in. wide and 3/16-in. thick can be handled.

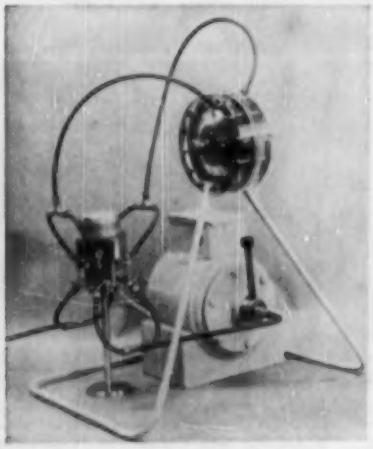


The feed stroke is adjusted by a small handwheel even while the unit is operating.

A limit switch starts the operating cycle. Stock is fed on the up stroke of the press. *Write*: Special Engineering Service Inc., 8161 Livernois Ave., Detroit 4, Mich. *Phone*: Texas 4-8700

Controlled Volume Pump

Accurate metering of liquids or gases against negative discharge pressures is featured. The pump is ideal for all low-capacity, flow-control problems that involve metering from high suction to lower discharge pressure.



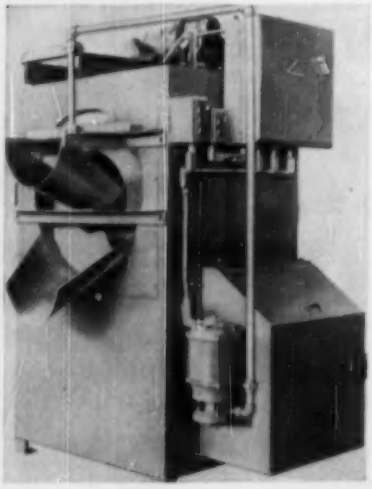
The pump is immune to pressure variations in the system. The only requirement is that suction pressures be maintained (naturally or mechanically) at least 5 psi above discharge pressures.

Leakproof construction with no running seals or stuffing boxes enables the pump to handle dangerous and highly corrosive materials easily. Complete scavenging of the pump chamber insures the highest metering accuracy. *Write*: Milton Roy Co., Station L, 1300 E. Mermaid Lane, Philadelphia 18, Pa. *Phone*: Chestnut Hill 7-8000

Batch Washer

Small parts can be high-pressure, spray-washed economically in bulk by the rotary-drum machine.

A drum with a helical spiral tumbles parts gently to expose all surfaces to the fan-shaped spray nozzles inside the drum.



The drum is perforated to drain the solution, oil, chips and other impurities. Drums can be made for any batch capacity. For most operations a volume of 2 cu ft is ample.

Complete draining and quick flash drying are done by tumbling and pumping off as the parts are discharged. *Write*: Alvey-Ferguson Co., Disney St., Cincinnati 9, O. *Phone*: Redwood 1-7000

Coolant Clarifier

Here is a magnetic separator clarifier for completely automatic cleaning of machine tool coolants. It gives better finishes, fewer rejects, longer wheel or tool life and less down time.

No extra floor space is needed; the unit can be mounted on existing coolant tanks or on any part of the machine.

The flow of coolant is always in complete contact with a permanent magnetic drum as it passes through the clarifier. Drum speeds may be varied to suit different types of coolants.

Operation is continuous, and the unit does not clog or require shutdowns for cleaning or sludge removal. *Write*: Industrial Division, U. S. Hoffman Machinery Corp., 105 Fourth Ave., New York 3, N. Y. *Phone*: Oregon 7-3600

Rubber Roller

A longer-lasting roller for electrolytic tin plate lines and lines for cleaning and annealing steel gives greater pulling power.

A new synthetic rubber has a stronger gripping surface. Its porous construction gives the rollers more "edge" and greater resistance to glazing. The rollers come in any size up to 43 in. in diameter. *Write*: Dayton Rubber Co., Dayton, O. *Phone*: Randolph 1111

Presses

Of welded steel construction, these double-crank, straight-side presses have gears running in oil and a mechanically interlocked pneumatic clutch and brake unit. Capacities range from 100 to 300 tons.

Other features: Barrel-type motorized slide adjustment, automatic lubrication, pneumatic flywheel

brake, die lights, die cushions, pneumatic counterbalances and an interlocked electrical clutch control. *Write*: Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: 4-6511

Drill Grinder

Any included angle from 90 to 140 degrees can be ground with this machine.

The included angle is changed by tilting the grinding wheel head. A built-in clearance gage indicates the clearance angle being ground on any size drill.

Capacity: Two, three and four-flute drills from ⅛ to 2½-in. in diameter. *Write*: McDonough Mfg. Co., Eau Claire, Wis. *Phone*: Temple 2-6636

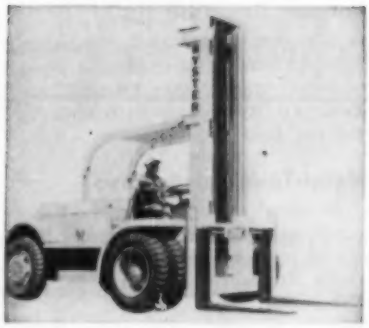
Lift Truck

Its capacity is 20,000 lb at 24-in. load centers.

An overhead tilting mechanism and heavier uprights give maximum stability and rigidity under capacity loads.

Both gasoline and diesel engines are available. Travel speeds are more than 20 mph in either forward or reverse.

Vacuum-powered brakes give



effortless braking. Center-point steering and a sharp outside turning radius of 179 in. make for maneuverability. *Write*: Hyster Co., 2902 N.E. Clackamas St., Portland 8, Oreg. *Phone*: Tuxedo 5011

Iron Powder Electrode

Here is a low-hydrogen, hard-surfacing electrode that combines the speed of contact-type electrodes with the weld metal soundness and crack resistance of low-hydrogen weld deposits.

Weld metal deposited by Hardalloy 48 electrodes is highly alloyed high-chromium iron. Its as-deposited hardness is above 55 Rc.

Welding is as much as 50 per cent faster. The electrodes can be used with either direct current reverse polarity or alternating current. Electrode sizes are ⅛, 5/32 and 3/16-in. *Write*: McKay Co., 330 McKay Bldg., Pittsburgh 22, Pa. *Phone*: Atlantic 1-5380

Indexing Table

This automatic table eliminates jigs and fixtures and permits the drilling of complex patterns with no more effort than pushing a button.

The micropositioner can be used

with virtually any vertical spindle machine. Accuracy of the locating mechanism is within ±0.001 in.

The table is equipped with a sensing mechanism guided by steel tape indented to indicate hole location. *Write*: Micro-Positioner Corp., 1151 S. Broadway, Los Angeles 15, Calif.

Electric Truck

This narrow walkie truck is for handling tin plate pallets and skid platforms.

A 4-in. clearance between the lifting forks allows the truck to straddle the center stringer of a pallet. Forks are available in lengths up to 48 in.

Lowered height of the truck is 3¼-in.; its lift is 4 in. An automatic timing device gives smooth starts. All controls are in the handle head of the truck. *Write*: Dept. R-33, Lewis-Shepard Products Inc., Watertown, Mass. *Phone*: Watertown 4-5400

Fast-Drying Enamel

Synthetic finishes for heavy equipment, such as farm and road machinery and machine tools, have excellent adhesion to solvent-cleaned metal. Resistance to gasoline and oil is superior.

The pigmented enamels in most colors set up so rapidly that parts can be handled in about 15 minutes. Even reds and blacks that may need up to 30 minutes to set do not seriously impede production. The material is tack free in 2 to 3 hours. *Write*: Finishes Division, E. I. du Pont de Nemours & Co., Wilmington, Del. *Phone*: Wilmington 4-5121

OUTLOOK MA
MARKET OUTL

NEW literature

Write directly to the company for a copy

Steel Strapping Machines

Machines for strapping packages weighing up to 75 lb are illustrated—4 pages. Equipment for strapping 100 to 800 lb is described—4 pages. Gerrard Steel Strapping Division, U. S. Steel Corp., 2915 W. 47th St., Chicago 32, Ill.

Dehumidifiers

Here's application data on central station, sprayed coil dehumidifiers—bulletin 7827-H, 20 pages. American Blower Corp., Detroit 32, Mich.

Thermocouple Wire

Conductor specifications and recommended insulations for various operating temperatures are listed—bulletin 1701, 12 pages. Revere Corp. of America, Wallingford, Conn.

Low Temperature Brazing

The joining of steel tubing, brass to brass and steel to cast iron is illustrated—bulletin 70, 4 pages. Handy & Harman, 82 Fulton St., New York 38, N. Y.

Steel Joists

Properties and advantages of lightweight, open-web steel joists are given—20 pages. Joseph T. Ryerson & Son Inc., P.O. Box 8000-A, Chicago 80, Ill.

Control Transformers

Voltage regulation curves for selecting the proper transformer are shown in catalog GED-2767, 32 pages. General Electric Co., Schenectady 5, N. Y.

Nickel-Plated Steel

Here's a 12-page manual that describes forming, welding, cleaning, handling and testing of nickel-plated steel. Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.

Steel Tubing

Stainless, alloy and carbon steel, both seamless and welded, are described—bulletin TB-408, 8 pages. Alloy mechanical tubing is covered in bulletin TB-360, 4 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Centralized Lubrication

Case histories show the advantages of centralized lubrication—8 pages. Farval Corp., 3249 E. 80th St., Cleveland 4, O.

Vacuum Degasser

A mobile degasser for purifying molten metal is covered in a 2-page bulletin. Kinney Mfg. Division, New York Air Brake Co., 3640 Washington St., Boston 30, Mass.

Metal-To-Metal Bonding

An adhesive for bonding and honeycomb, sandwich construction is illustrated in a 4-page bulletin. Honeycomb Structures Co. Inc., 5510 W. 102nd St., Los Angeles 45, Calif.

Hydraulic Circuits

Heat and its generation and dissipation in hydraulic circuits are covered in bulletin 90030, 8 pages. Oilgear Co., 1593C W. Pierce St., Milwaukee 4, Wis.

Slitting Lines

Basic information on design, selection and operation of slitters and slitting lines is given in a 74-page book. Yoder Co., 5500 Walworth Ave., Cleveland 2, O.

Heat Treatment

Furnaces for the heating and heat treatment of aluminum and other light metal alloys are described in bulletin SC-171, 8 pages. Surface Combustion Corp., Toledo 1, O.

Grinding

How abrasive belt grinding increases production is shown in 46 illustrated case histories—31 pages. Engelberg Huller Co. Inc., 831 W. Fayette St., Syracuse 4, N. Y.

Stainless Steel

Properties of type-301 stainless steel, an austenitic steel with 17-per-cent chromium and 7-per-cent nickel, are given in a data sheet. Sales Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Refractories

Plastic and castable refractories, cements and mortars for melting furnaces, annealing ovens and heat treating furnaces are described in a 16-page bulletin. Ramtite Co. Division, S. Obermayer Co., 2563 W. 18th St., Chicago 8, Ill.

Metallic Stearates

Properties and uses of metallic stearates are given in a 36-page bulletin. Witco Chemical Co., 122 E. 42nd St., New York 17, N. Y.

Contour Band Saw

The use of the band saw in machining is presented in a 10-page folder. DoAll Co., Des Plaines, Ill.

Cast Steel Shot

A heat treated shot for blast cleaning and peening is covered in bulletin 89-B, 8 pages. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Grinders

Plain, universal and centerless grinders are covered in a 20-page bulletin. Landis Tool Co., Waynesboro, Pa.

Heat Exchangers

Formulas for determining the size of heat exchangers, construction materials and solutions needed for plating, pickling and anodizing solutions are given in a 4-page bulletin. Carl Buck & Associates, Essex Fells, N. J.

Nickel-Plated Steel

A 12-page manual describes nickel plated products and their forming, welding, cleaning, handling and testing. Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.

Tumbling Machines

An 18-page catalog describes tumbling barrels, mixers and finishers and screen separators. Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, O.

Temperature Conversion Table

Fahrenheit readings are converted to centigrade and vice versa in the range from −200 to +4000 degrees by a chart that shows temperature ranges of various sensing elements. Thermo Electric Co. Inc., Rochelle Park Post Office, Saddle Brook, N. J.

Can Testing

Both automatic and hand-operated testers for cans up to 5 gallons are described—section 6, catalog 36B, 12 pages. E. W. Bliss Co., 50 Church St., New York 7, N. Y.

Hydraulic Power Units

Quill-type units for step drilling and other machining operations that can be incorporated in special machines are described in bulletin 45352, 20 pages. Ex-Cell-O Corp., 1200 Oakland Blvd., Detroit 32, Mich.

Silicone Guide

Almost 150 of the most used silicone products are described in a 12-page bulletin. Dow Corning Corp., Midland, Mich.

Carloading

A chart illustrates carloading procedures for wall-anchored loads. Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

STEEL

December 26, 1955

Market Outlook

STEEL PRODUCTION isn't taking a holiday. It doesn't have time.

Output of steel for ingots and castings in the week ended on Christmas Day rolled along at 98 per cent of capacity. That's a decline of only 2 points from the preceding week.

Mills are loaded with orders. They could be even more heavily booked ahead if they would accept the business.

MEN AT WORK—The ingot producing departments of steel plants are staying on the job not only because of management's desires but because of union influence. A pause in basic steel production would crimp the tonnage available to finishing mills and fabricating plants and make it even more difficult than it is now for them to maintain full work weeks.

Every day is increasing the new record of ingot production. The old annual record of 111,609,719 net tons, set in 1953, was eclipsed in the week ended Dec. 18. But record production isn't sufficient. Consumption also is at a record.

UNPERTURBED— Demand is so great there's no alarm over reduced production in some sectors of the automobile industry, largest consumer of steel. Automakers are expected to want all the hot-rolled and cold-rolled sheets they can get from mills in the first quarter.

BACK TO NORMAL—Auto output has contracted only enough to eliminate overtime work. If the reduction goes no further than that, the only effect on steel buying will be a lessened demand for conversion steel and warehouse steel.

Any ingots not needed for rolling into products used by the auto industry can be diverted into steel for the construction industry and freight car builders. Both fields are booming.

NEW RECORD—More freight cars were ordered in November than in any month on record. Orders totaled 51,066 cars. The previous record was 39,000 cars in January, 1924. Order backlog on Dec. 1 was 109,370 cars, highest since the 115,000 on Apr. 1, 1952. A new record for backlogs is likely on Jan. 1, because December orders are expected to exceed November's.

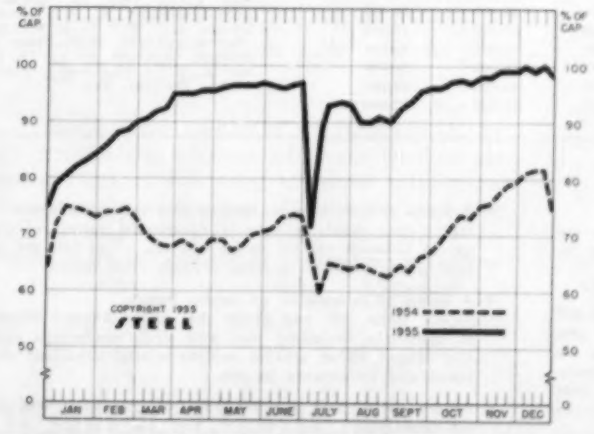
PUSH-UP—Pressure is still upward on prices. STEEL's price composite on steelmaking grades of scrap rose to $50.67 a gross ton in the week ended Dec. 21 from the preceding week's $50.17. Oven foundry coke rose $1.25 and $1.50 a ton in the East.

Molybdenum products rose an average of 5 per cent.

IMPORT PRICES UP—Prices of imported steel are up again. Sharpest increase is on plates, up $31 a ton. This reflects demand. Although it is heavy on almost all steel products, the pinch on plates stands out conspicuously, and it's likely to get worse because of the immense requirements of railroad freight car builders. Imported plates are now $170 a net ton, compared with our domestic price of $90. Hot-rolled sheets, another product in insufficient supply domestically, went up $20 a ton on the import list. Nearly all other imported forms of steel rose, too, except nails, which declined 15 cents a hundredweight.

A domestic producer of high-strength, low-alloy steel plates raised its base price above the rest of the market by $6 a ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 25	Change	Same Week 1954	Same Week 1953
Pittsburgh	99.5	— 2.5	68	75.5
Chicago	99	0*	82.5	74
Mid-Atlantic	98	— 1	67	71
Youngstown	95	— 5	70	60
Wheeling	98	— 5	62.5	68
Cleveland	93	— 5*	91.5	53
Buffalo	100	— 5	100	49
Birmingham	94.5	0	67	80
New England	92	+ 3	79	76
Cincinnati	92.5	0	72	67.5
St. Louis	100	— 7.5	62.5	64
Detroit	95	— 5.5	75.5	67.5
Western	98	— 9	88	86
National Rate	98	— 2	74.5	64

INGOT PRODUCTION‡

	Week Ended Dec. 25	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	146.5†	150.7	150.4	107.4
NET TONS (In thousands)	2,353†	2,421	2,416	1,726

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 23 Technical Outlook—p. 59

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 20 1955	Dec. 13 1955	Month Ago	Nov. Average
(1947-1949=100)	155.1	154.8	154.6	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 20

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.183
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.406
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.746
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	20.465
Structural Shapes	4.867	Pipe, Line (100 ft)	164.379
Bars, Tool Steel, Carbon (lb)	0.480	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.155	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.650	Tubing, Mechanical, Carbon	20.960
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H. R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Cannmaking Quality	6.733
Bars, C.F., Carbon	8.650	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.575
Bars, C.F., Stainless, 302 (lb)	0.488	Bale ties (bundle)	6.473
Plates, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 21 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	167.67
Index in cents per lb	5.659	5.659	5.659	5.270	4.545

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.95	$127.95†	$128.14	$117.96	$103.50
No. 2 Fdry. Pig Iron, GT.	58.99	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	52.16
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	53.27
Steelmaking Scrap, GT	50.67	50.17	46.33	32.50	45.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.
†Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 21 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	4.18
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.25
Strip, C.R., Chicago	6.35	6.35	6.35	5.85	4.50-4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{47}{64}$" Pitts.	5.025	5.025	5.025	4.675	4.10-4.30
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$53.00
Basic, Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	59.00	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	185.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$50.50	$50.00	$45.50	$32.50	$46.50
No 1 Heavy Melt, E. Pa.	52.00	50.00	48.00	32.00	45.00
No. 1 Heavy Melt, Chicago	49.50	50.50	45.50	33.00	45.00
No. 1 Heavy Melt, Valley	52.50	52.50	48.00	34.50	46.25
No. 1 Heavy Melt, Cleve.	51.50	50.50	45.50	32.50	45.75
No. 1 Heavy Melt, Buffalo	45.50	45.50	43.50	30.50	49.88
Rails, Rerolling, Chicago	71.00	73.50	66.50	52.50	67.00
No. 1 Cast, Chicago	50.50	50.50	48.50	40.00	63.00

COKE, Net Ton

Beehive, Furn, Connisvl.	$14.125	$13.625	$13.625	$13.75	$14.75
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Dec. 21 Price	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1954 Avg.
Copper	43.00-50.00	Dec. 15, 1955	43.00-49.00	44.420	44.594	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	15.300	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.000	13.020	11.500
Tin	109.375	Dec. 20, 1955	109.50	97.825	96.230	88.649
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	26.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
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- **Reports on iron and steel production, and materials and product shipments.**

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Nonferrous Metals

As the new year approaches, the nonferrous industry pauses to look at fading '55. It has been a year of technological progress and peak demand for most

Nonferrous Metal Prices, Pages 84 & 85

ONE YEAR AGO, primary copper was selling for 30 cents a pound. Most copper men expected that this would be an all-time high.

1955 — With the new year came high level demand and continual labor strife. Result: Primary copper prices soared to 43 cents a pound. Most experts feel that the price could continue to go up.

Each month during the year brought some kind of a crisis to copper. This month was no exception. After threatening earlier in the month, Chilean miners walked out on Dec. 14. The threat and the walkout point out an important fact: No matter how many predictions are made that copper supplies will brighten, it is up to the copper miners to make these forecasts come true.

Vicious Circle—The Chilean copper miners are in a cycle of unrest. They strike for more money; the copper shortage gets worse; prices soar. When they get their raise, the miners return to work, but the price stays at the higher level. Result: The miners, after a few weeks, take a new look at the price structure and declare: "We should have more money." What can solve this dilemma? Perhaps the only solution is that the miners must realize that each time the price of copper rises, more companies (which want to use the red metal) decide to find a substitute material.

Statistics — The Copper Institute, New York, reports that during the first 11 months of this year world crude production reached 2,398,818 tons (see table). Secondary production for the same period was 121,352 tons.

World production for the year will reach an estimated 2,737,997 tons. Copper advocates are confident that world production could exceed 3 million tons in '56. But in the final analysis, it is the copper miners who hold the key to a better supply.

Aluminum Content with '55

Primary aluminum production will reach the 1.5-million-ton mark in the next few days. This will be the fourth year in a row that the domestic aluminum industry has established new records.

The Aluminum Association reports that during the first three quarters of this year its members had substantial increases in shipments of semifabricated aluminum products. Examples: Sheet and plate jumped 39 per cent; foil, 41 per cent; extruded products, 50 per cent; rolled bar and rod, 25 per cent.

Aluminum ingot sold for 22.20 cents a pound one year ago. Today, the price is 24.40 cents a pound. Point of interest: Aluminum ingot had two price hikes during '55, but as the year closes aluminum is in a better position from a price standpoint than it was in January.

Tin: Some Cause for Alarm

Tin remains in tight supply, but there is an undertone of concern as to what will happen to the tin market when the U. S. stops stockpiling some 14 per cent (23,000 tons) of the world's production.

Tin plating uses some 62 per cent of domestic consumption. While most tin producers feel that this percentage will increase next year, there is a cloud on the horizon. Aluminum, impact-extruded cans could gain wide acceptance in the coming year. Outlook: There will be a strong tin market, but supply could outstrip demand by late 1956.

Nickel Shortage Continues

Nickel will continue to be in tight supply, but the government may take a more active stand on policing military orders. While the Office of Defense Mobilization continues to announce that it will defer stockpile quotas, it does the civilian market little good if military needs continue to increase. Meanwhile, opportunists continue to sell nickel on the gray market for over $3 a pound.

Solution—One fact stands out: While the estimated supply of nickel for the U. S. is about 300 million lb, it is not enough to meet demand. And no matter how many times the government defers stockpile requirements, there will not be enough nickel until new metallic capacity is brought in to meet military and civilian needs. One step in the right direction: Refining and smelting facilities for the U. S. Nicaro mine in Cuba.

Lead, Zinc Show Gains

Lead and zinc producers enjoyed 1955. There was little to be alarmed about. Demand was high and production almost kept up with this increased demand.

When the final tallies are in this month, some 1.06 million tons of zinc will have been used to meet domestic requirements. Lead consumption will be about 1.24 million tons.

Only cloud on the horizon for zinc: Substitution of aluminum in automobiles. But, says the American Die Casting Institute, some 360,000 tons of zinc diecastings will be consumed this year. And say zinc advocates: "Even though some automobile models are dropping diecast zinc grilles, use of zinc diecastings will increase about 10 per cent in 1956."

World Copper Production Falls in November

	—Crude Production—			
	Primary	Secondary	Refined	Deliveries to Fabricators
11 months	2,398,818	121,352	2,477,960	2,498,464
November	228,646	9,304	239,963	248,758
October	245,462	11,439	244,255	246,898

Source: Copper Institute

It Costs No More To Give More— If You Give The Bonus In Savings Bonds!

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If you don't have the Payroll Savings Plan, and are wondering whether your people would like to receive their bonus in Bonds, here are a few significant facts:

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—Payroll Savers hold their Bonds: From May 1, 1951, to September 30, 1955, approximately $18.7 billion E Bonds reached 10-year maturity dates. On September 30, 1955, approximately 70.3% of the matured bonds were retained by their owners under the automatic extension plan. With additional interest earned since maturity dates ($560 million), cash value of the matured bonds held by individuals amounts to approximately $13.7 billion.

—on September 30, 1955, the cash value of Series E and H Bonds—the kind sold only to individuals—totaled 39.7 billion dollars, a new high.

To the Payroll Saver, and to the man who buys his Bonds at a bank (because his company does not provide the Payroll Savings Plan) a One Hundred Dollar Savings Bond looks bigger and better and *is* bigger and better, than a check for $75. *Make this a merrier Christmas for every employee. Give the gift that keeps on giving.*

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STEEL
The Metalworking Weekly

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.60; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.30; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.5% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 50.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.80; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.00 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom, per troy oz.

Palladium: $22-24 per troy oz.

Platinum: $97-$117 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.50 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 109.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $5.00. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 33.00-34.50; No. 12 foundry alloy (No. 2 grade) 31.75-32.00; 5% silicon alloy, 0.60 Cu max, 33.50-33.75; 13 alloy, 0.60 Cu max, 33.50-33.75; 195 alloy, 33.50-33.75; 108 alloy, 31.50-32.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.50-32.75; grade 2, 30.50-31.75; grade 3, 29.75-31.00; grade 4, 29.25-30.50.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.23; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H. R. strip, $19; C. R. trip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	97	74	93
Seamless Tubes	122	110	153
Shot, Blocks		71	

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4		
0.156-0.172	57.5	55.9		
0.188	57.5	55.9		71.7
0.219-0.234	54.5	52.9		
0.250-0.281	54.5	52.9		65.4
0.313	54.5	52.9		65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1		52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9		
1.625-2.000	48.2	46.2		50.5
2.125-2.500	47.0	45.0		
2.563-3.375	45.6	43.6		

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.5	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	38.1	41.3
0.076-0.061	39.3	45.1	38.3	41.5
0.060-0.048	39.9	45.6	38.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c. Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 20.00-20.50; old sheets 17.00-17.50; borings and turnings, 11.50-12.00; crankcases, 17.00-17.50; industrial castings 17.00-17.50.

Copper and Brass: No. 1 heavy copper and wire 42.00-42.50; No. 2 heavy copper and wire, 38.50-39.00; light copper, 36.00-36.50; No. 1 composition red brass, 32.50-33.00; No. 1 composition turnings, 31.50-32.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	63.13b	60.36c	....	63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	26.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.500	32.000
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	65.33g	66.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.65e	37.875	37.625	37.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 18.00-18.50; new brass clippings, 28.00-28.50; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.50-27.00; auto radiators, unsweated, 25.00-25.50; cocks and faucets, 25.00-25.50; brass pipe, 26.00-26.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-65.00; old sheets, 50.00-65.00; turnings, 44.00; rods, 54.50-65.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 24.00-25.00; 3003 clippings, 24.25-25.00; 6151 clippings, 24.00-25.00; 5052 clippings, 24.00-25.00; 2014 clippings, 24.00; 2017 clippings, 24.00; 2024 clippings, 24.00; mixed clippings, 23.50-24.00; old sheet, 20.00-21.50; old cast, 21.00-21.50; clean old cable (free of steel), 24.50-25.00; borings and turnings, 21.50-22.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper, 39.75; refinery brass (60% copper) per dry copper content, 39.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper, 39.75; No. 1 composition borings 34.00; No. 1 composition solids, 35.00; heavy yellow brass solids, 24.00; yellow brass turnings, 23.00; radiators, 27.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.225; 200-499 lb, $1.21; 500-999 lb, $1.205; 1000 lb or more, $1.20.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 30.50; 10,000 lb and over, 28.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 98.875; 16-oz bottle, 95.625; 80-oz bottle, 93.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 76.20; 100-600 lb, 67.40; 700-1900 lb, 64.90; 2000-9900 lb, 63.20; 10,000 lb or more, 62.06.

Stannous Chloride (anhydrous): Less than 50 lb, $1.673; 50 lb, $1.333; 100-300 lb, $1.183; 400-900 lb, $1.159; 1000-1900, $1.135; 2000-4900 lb, $1.098; 5000-19,900 lb, $1.037; 20,000 lb or more, 97.60.

Stannous Sulphate: Less than 50 lb, $1.268; 50 lb, $1.068; 100-1900 lb, $1.048; 2000 lb or more, $1.028.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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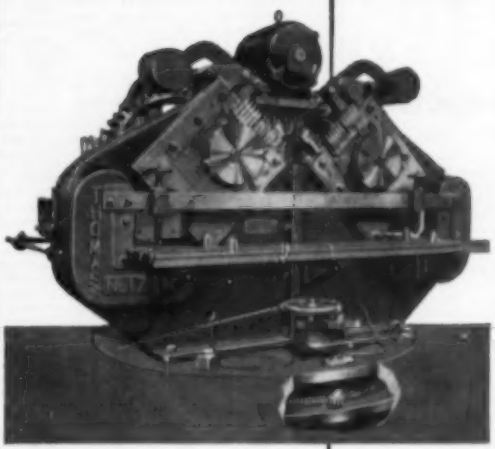

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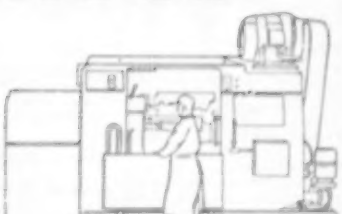

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 87. Key to footnotes, Page 89.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston S5 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ....76.00
Gary,Ind. U5 .....68.50
Johnstown,Pa. B2 .....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall,Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill R2 U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 ....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 ....84.50
Houston S5 .....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
LosAngeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ...84.50
S.SanFrancisco B3 ...94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 ....96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ...115.00
Gary,Ind. U5 .....96.00
Houston S5 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2,W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
YoungstownR2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston S5 .....5.275
IndianaHarbor,Ind. Y1..5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ...5.275
Kokomo,Ind. C16 ....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11..5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth,O. P12 ....5.025
Roebling,N.J. R5 ....5.125
S.Chicago,Ill R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston S5 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 .....4.65
KansasCity, Mo. S5 ....4.70
Lackawanna,N.Y. B2 ....4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....5.25
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 .....5.40
Lackawanna,N.Y. B2 ....4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes

Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houston S5 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill U5 .....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....4.65
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ....5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GraniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 .....5.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ..4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.25
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.725
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....5.65
Fontana,Calif. K1 .....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 .....6.725
Coatesville,Pa. L7 .....7.025
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston S5 .....6.825
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 .....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston S5 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES

Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton, Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.65
Houston S5 .....4.90
Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ....4.65
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
N.Tonawanda,N.Y. B11 ..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S. Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren, O. R2 .....4.65
Weirton,W.Va. W6 .....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 .5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana,Calif. K1 ....6.625
FairlessHills,Pa. U5 ...5.725
Gary,Ind. U5 .....5.575
Houston S5 .....5.825
Ind.Harbor,Ind. I-2, Y1..5.575
Johnstown,Pa. B2 .....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago R2, U5, W14..5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
Ind.Harb.,Ind. I-2, Y1..6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S. Chicago W14 .....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 .....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-rolled Alloy

Clairton,Pa. U5 .....5.65
Gary,Ind .U5 .....5.65
Houston S5 .....5.90
KansasCity,Mo. S5 .....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 .....8.35
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 .....8.30
Warren,O. C17 .....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2 5.90
Buffalo B5 .....5.95
Camden,N.J. P13 .....6.35
Carnegie,Pa. C12 .....5.90
Chicago W18 .....5.90
Cleveland A7, C20 .....5.90
Detroit R7 .....5.90
Detroit B5, P17 .....6.10
Donora,Pa. A7 .....5.90
Elyria,O. W18 .....5.90
FranklinPark,Ill. N5 ...5.90
Gary,Ind. R2 .....5.90
GreenBay,Wis. F7 .....5.90
Hammond,Ind. L2, M13 .5.90
Hartford,Conn. R2 .....6.40
Harvey,Ill. B5 .....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ...5.90
Midland,Pa. C18 .....5.90
Monaca,Pa. S17 .....5.90
Newark,N.J. W18 .....6.35
NewCastle,Pa.(17) B4 ...5.90
Pittsburgh J5 .....5.90
Plymouth,Mich. P5 ....6.15
Putnam,Conn. W18 .....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 .....5.90
SpringCity,Pa. K3 .....6.35
Struthers,O. Y1 .....5.90
Waukegan,Ill. A7 .....5.90
Worcester,Mass. W1v ..6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.60
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 ....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis F7 .....7.425
Hammond,Ind. L2,M13 .7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5 ...7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 .....7.425
SpringCity,Pa. K3 .....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.425
Waukegan,Ill. A7 .....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.65
Atlanta A11 .....4.85
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ...5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ...4.80
Fontana,Calif. K1 .....5.35
Ft.Worth,Tex.(42) T4 ...5.10
Gary,Ind. U5 .....4.65
Houston S5 .....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ...5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 ...5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ...4.65
S.SanFrancisco W3 ...5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill(1) N15 ...4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ...5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¾-1" B2 6.15
KansasCity,Kans. S5 ..6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. F11 .....6.15
Pittsburgh U5 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¾-1" B2..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

Chicagolits.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4...5.10
Franklin,Pa. (3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J3 ..4.50
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.65
Tonawanda(3) R2 .....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 ..11.50
McK.Rks. (D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ...4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. N12 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R.(19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Kokomo,Ind. C16 ....5.475
Niles,O. N12 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R.(14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 ....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind U5 .....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ..6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2....4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 ....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ..5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ...5.325
SparrowsPoint,Md. B2 .5.325
Steubenville,O. W10 ..5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ..7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(33) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.90	...
Canton,O.	R2 ....6.10	6.55
Dravosburg	U5 ..6.10	...
Fairfield	T2 ....6.10	...
Gary,Ind.	U5 ....6.10	6.35
Ind.Harbor	I-2 ..6.10	6.35
Kokomo,Ind.	C16 6.20	...
MartinsFry.	W10 6.10	...
Newport,Ky.	N9 ..6.10	6.35
Pitts.,Calif.	C11 ..6.85	...
SparrowsPt.	B2 ..6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry.,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City, Ala. R2 ....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05‡
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ...5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ..6.60*
SparrowsPt.,Md. B2 ...5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 .....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeachBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key to Producers

A1 Acme Steel Co.
A2 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E8 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Ingoe Bros. Inc.
I-3 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A19 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1 4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ...5.425
NewBritain(10) S15 ...4.325
Pittsburg,Calif. C11 ...5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
SanFrancisco S7 .....5.05
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.323
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3..5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.425
Conshohocken,Pa. A3 ..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1 6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3..7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ...6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..6.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland A7, J5 .....6.25
Conshohocken,Pa. A3 ..6.30
Dearborn,Mich. D3 ....6.35
Detroit D2, M1, P20....6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ..6.25
Fontana,Calif. K1 .....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2...6.25
LosAngeles C1 .....8.30
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ...6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7, D2.6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 ....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Portsmouth,O. P12 ....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6.....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ...6.25
Trenton,N.J.(31) R5 ....7.90
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 .....6.25
Weirton,W.Va. W6 ....6.25
Worcester,Mass. A7 ....6.80
Youngstown C8, Y1 ....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....14.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 ....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ...13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.85	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	8.95	10.50	12.65	...
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	...	...
Detroit D2	7.10	9.05	10.60	12.75	...
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
Follansbee,W.Va. F4	7.00	8.95	10.50**	...	...
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	...
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	...
NewKensington,Pa. A8	7.00	8.95	10.50	...	...
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	*7.20*	*9.05*	*10.60*	*12.75*	*15.45*
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.65 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	...
Buffalo W12	...	...	14.40	...	...
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	...	...
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	...
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.50*	9.50*	10.40*	11.40*	...
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	...
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.55	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	...	...	...
Newport,Ky. N9	12.80	...	...	...
Vandergrift,Pa. U5	12.85	13.35	13.85	14.85
Zanesville,O. A10	12.80‖	13.35‖	13.85‖	14.85‖

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‖
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‖

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ‖Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2, 9.38	9.55	
Fairless,Pa. U5..	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1.	9.20	9.45
Pitts.,Calif. C11..	9.95	10.20
Sp.Pt.,Md. B2 ..	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10.	9.20	9.45

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75

STRIP, Galvanized (Continuous)	
Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

STRIP, Electrogalvanized	
Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	6.80*

*Plus galvanizing extras.

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)	
Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70
Yorkville,O. W10	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)	
Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)	
Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.25
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville Ill. K4 ....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville,Ind. M8..6.35
Donora,Pa. A7 .....6.25
Duluth,Minn. A7 .....6.25
Fairfield,Ala. T2 .....6.25
Fostoria,O.(24) S1 ....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ..6.77
Johnstown,Pa. B2 .....6.25
Joliet,Ill. A7 .....6.25
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.50
Monessen,Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.25
Palmer,Mass. W12 .....6.55
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.25
Rankin,Pa. A7 .....6.25
S.Chicago,Ill. R2 .....6.25
S.SanFrancisco C10 ....7.20
SparrowsPoint,Md. B2 ..6.35
Sterling Ill.(1) N15 ....6.25
Sterling Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. A7 ....6.55

WIRE, MS Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 .....8.20
Pittsburg,Calif. C11 ...8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ....8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.80
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 ....7.85
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ...7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ...7.90
Palmer,Mass. W12 .....7.90
Pittsburg Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
S.Chicago,Ill. R2 .....7.60
S.SanFrancisco C10 ....8.55
SparrowsPoint,Md. B2 ..7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 ....7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ..13.08
Johnstown,Pa. B2 .....12.55
Kokomo Ind. C16 .....12.55
Minnequa,Colo. C10 ...12.30
Monessen,Pa. P16 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
S.SanFrancisco C10 ....12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. A7,T6.12.55

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2 .....10.70
Minnequa,Colo. C10 ..10.825
Monessen,Pa. P16 .....10.70
Muncie,Ind. I-7 .....10.90
Pittsburg,Calif. C11 ...11.50
Portsmouth,O. P12 .....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ...10.80

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O.(23) S1	10.05
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg Calif. C11	10.13
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
MinnequaColo. C10	9.90
Pittsburgh Calif. C11	10.45
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	161
Bartonville,Ill. K4	161
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	179††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN Fence, 9-15 ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Ala.City, 18 ga. R2	267**
Aliq'ppa,Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

Wire (16 Gage)	An'ld Galv. Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.55
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.60	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.60	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.10
Bartonville(48) K4	7.50	8.10
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	
Crawfordsville M8	7.50	8.10
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla.M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	8.00††
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.35	8.75†
Portsmouth,O. P12	7.40	
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ling(1)(48)N15	7.40	8.00††
Struthers,O.(48)Y1	7.40	7.90†
Worcester,Mass.A7	7.70	

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
- †⅛" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted):
- ½" x 6" and smaller. 61

†⅛" x 4" and smaller and shorter are not nutted.

NUTS

Reg. & Heavy Square Nuts, all sizes 61

H. P. Reg. & Heavy Hex Nuts:
- ⅜" & smaller 64
- ⅞" to 1¼" incl. 63
- 1⅛" to 1½" incl. 65
- 1⅝" & larger 61

C.P. Reg. & Heavy Hex Nuts
- ⅜" & smaller 64
- ⅞" & larger 61

Semifinished & Finished Nuts
- ⅜" & smaller 66
- ⅞" & larger 63

Semifinished Slotted Reg. & Heavy Hex Nuts
- ⅜" & smaller 66
- ⅞" & larger 63

Hot Galvanized Nuts, all types
- 1⅛" & smaller 44

(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Btd. Hexagon head, upset, packages)

Bright:

6" and shorter:
- ¼" through ½" diam. 34
- ⅝" & ¾" diam. 31
- ⅞", 1" 8

Longer than 6"
- ¼" through ⅝" diam. 3
- ¾" through 1" diam. +13

High Carbon, Heat-treated:

6" and shorter:
- ¼" through ½" diam. 20
- ⅝" & ¾" diam. 16
- ⅞", 1" +11

Longer than 6"
- ¼" through ⅝" diam. +23
- ¾" through 1" diam. +41

(New Btd. Hexagon head, upset, bulk)

Bright:
- ½" x 6" & smaller & shorter 49
- ⅝" & ¾" diam. x 6" & shorter 48
- ⅞", 1" x 6" & shorter 31

High Carbon, Heat-treated:
- ½" x 6" & smaller & shorter 41
- ⅝" & ¾" diam. & 6" & shorter 39
- ⅞", 1" x 6" & shorter 29

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)
- No. 2 to ⅜" incl., Square: 25,000 to 100,000 pieces 29; 200,000 or more pieces 27
- No. 2 to ⅜" incl., Hex.: 25,000 to 199,999 pieces 18; 200,000 or more pieces 25

MACHINE SCREWS, SLOTTED (Bulk)
- No. 2 to ¼" diam, incl.: 25,000 to 199,999 pieces 29; 200,000 or more pieces 27
- ⅜" to ½" diam, incl.: 15,000 to 99,999 pieces 29; 100,000 or more 27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
2⅝	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails No. 2	Tee Rails All 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...(16)	5.65
Lackawanna,N.Y. B2	....	....	...(16)	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES
- Fairfield,Ala. T2 5.625
- Gary,Ind. U5 5.625
- Ind.Harbor,Ind. I-2 5.625
- Lackawanna,N.Y. B2 5.625
- Minnequa,Colo. C10 5.625
- Seattle B3 5.775
- Steelton,Pa. B2 5.625
- Torrance,Calif. C11 5.775

TRACK BOLTS (30) Treated
- Cleveland R2 12.40
- KansasCity,Mo. S5 12.40
- Lebanon,Pa. B2 12.40
- Minnequa,Colo. C10 12.40
- Pittsburgh O3, P14 12.40
- Seattle B3 12.90

AXLES
- Ind.Harbor,Ind. S13 7.25
- Johnstown,Pa. B2 7.25

JOINT BARS
- Bessemer,Pa. U5 5.825
- Fairfield,Ala. T2 5.825
- Ind.Harbor,Ind. I-2, Y1 5.825
- Joliet,Ill. U5 5.825
- Lackawanna,N.Y. B2 5.825
- Minnequa,Colo. C10 5.825
- Steelton,Pa. B3 5.825

SCREW SPIKES
- Cleveland R2 11.90
- Pittsburgh O3 11.90

STANDARD TRACK SPIKES
- Fairfield,Ala. T2 7.90
- Ind.Harbor,Ind. I-2, Y1 7.90
- KansasCity,Mo. S5 7.90
- Lebanon,Pa. B2 7.90
- Minnequa,Colo. C10 7.90
- Pittsburgh J5 7.90
- Seattle B3 8.40
- S.Chicago,Ill. R2 7.90
- Struthers,O. Y1 7.90
- Youngstown R2 7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	9.25
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic, f.o.b. Riverton, N.J., and Niagara Falls, N.Y., in bags	9.50
Canadian, f.o.b. Shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	82.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper: *Electrolytic*	*14.25**
Reduced	*14.25**
Lead	*7.50**
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50†
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh: *1000 lb and over*	*4.30*
Less than 1000 lb	*4.45*
Chromium, electrolytic 99.2% Cr min.	3.5*

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cols. lower.
(8) 10 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.35 off for untreated.
(21) New Haven, Conn., base.
(22) Dold, San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 13 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; dold in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37¢		58.5¢		76.5¢		92¢		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.83		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5¢		6¢		8¢		8.5¢		11.5¢		17¢		23¢	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	*16.5*	*+0.75*	*19.5*	*3.75*	*22*	*6.75*	*24.5*	*8*
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Lorain, O. N3	...	...	....	....	....	....	*18.5*	*1.25*	*21.5*	*5.25*	*24*	*8.75*	*26.5*	*10*
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	*18.5*	*1.25*	*21.5*	*5.25*	*24*	*8.75*	*26.5*	*10*
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5¢		37¢		58.5¢		76.5¢		92¢		$1.08	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.79	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	*25*	*9*	*25.5*	*9.5*	*27*	*9.75*	*27*	*9.75*	*17.5*	*+0.25*	*17.5*	*+0.25*
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Lorain, O. N3	*27*	*11*	*27.5*	*11.5*	*29*	*11.75*	*29*	*11.75*	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	*27*	*11*	*27.5*	*11.5*	*29*	*11.75*	*29*	*11.75*	*19.5*	*1.75*	*19.5*	*1.75*
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	28.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	36.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	18.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless:	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	43.95	59.55	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...		4.000
18.25	4.25	1	4.75	...		2.305-2.475
18	4	2	9	...		2.675-2.6775
18	4	2	....	...		1.765
18	4	1	....	...		1.600
13.75	3.75	2	5	...		2.245
13.5	4	3	....	...		1.865
9	3.5	..	....	...		1.180
6	4	2	....	5		1.105
6	4	3	....	6		1.350
1.5	4	1	....	8.5		0.960

Tool steel producers include: A4, A8, B2, B3, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	60.15	60.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.39	65.39	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	59.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U8	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	60.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.60%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	95.50
Keokuk, O.H. & Fdry, 12½ lb pigets, 16% Si, frgt allowed K2	98.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.86
Rockwood Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max.)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.†	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	...	7.62	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62§	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	48.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.88
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	...	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.99	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.36
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.96	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.89**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	9.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.50	9.18	....	7.72	...	7.74	8.51	13.51	7.94	7.68	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25§	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00§	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.00
Washington	7.50	8.79	7.97	....	8.12	...	8.06	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—500 to 9999 lb; ‖—400 to 999 lb; ‡—4000 lb and over; §—1000 to 1999 lb; ¶—1000 lb and over; ¶—1500 to 3999 lb; ‖—2000 to 3999 lb; §—f.o.b. local delivery in lots of 10,000 lb and over.

Year	Shipments (thousands of net tons) Actual	Calculated, Using Actual Values	Calculated, Using Logarithmic Values	Value of new construction put in place (1947-1949 prices) Industrial Buildings	Warehouses Office & Loft Buildings	Highways
1956	....	3,253	3,202	$2,577,000,000	$941,000,000	$4,216,000,000
1955	....	3,176	3,140	2,528,000,000	890,000,000	3,870,000,000
1954	3,135	3,161	3,146	2,943,000,000	789,000,000	2,573,000,000
1953	3,117	3,052	3,039	3,241,000,000	640,000,000	2,851,000,000
1952	2,864	2,871	2,865	3,239,000,000	461,000,000	2,489,000,000
1951	2,702	2,744	2,769	2,611,000,000	500,000,000	2,349,000,000
1950	2,277	2,312	2,334	1,216,000,000	396,000,000	2,367,000,000
1949	2,256	2,198	2,201	1,127,000,000	313,000,000	2,128,000,000
1948	2,326	2,304	2,307	1,524,000,000	344,000,000	1,672,000,000
1947	2,263	2,298	2,275	1,919,000,000	251,000,000	2,543,000,000

Sources: American Institute of Steel Construction; Department of Commerce; Department of Labor.

Structural steel fabricators peer into the future as . . .

Formula Forecasts Demand

FABRICATED structural steel shipments during the coming year will be about 3,250,000 tons, just 57,000 tons short of the record set in 1929. So says Nathan H. Schein, Building Materials and Construction Division, Business & Defense Services Administration, Department of Commerce.

Using a new mathematical formula developed by Mr. Schein, it is possible to predict as far as six months in advance what shipments of fabricated structural steel will be. The formula was derived from statistical data (1947 through 1954) on the construction industry. A comparison of calculated and actual shipments in the table above shows how accurate the method is when using final figures.

Basis of Validity — But as Mr. Schein points out: "When used as a forecaster, the formula is only as good as the predictions for related construction activity. For this reason, it is wise to revise the equations as more accurate information becomes available. In estimating shipments for 1956, we used the construction outlook prepared jointly by the Labor and Commerce departments. It would be possible to forecast shipments by applying the equation to any other good construction activity outlook."

Either of two equations may be used—one using final tonnage and dollar figures, the other using logarithms of these values. As the table shows, both come sufficiently close to accurate results to establish their validity. Mr. Schein has eliminated all types of construction activity which have little or no bearing on the shipments of fabricated structural steel. The three categories shown in the table represent 80 per cent of shipments, according to the American Institute of Steel Construction.

Using actual aggregate quantities for 1947-1954 as shown in the table, the following multiple regression equation was derived:

$$X_{1c} = 1532.87 + 0.23523X_2 + 1.00204X_3 + 0.04061X_4$$

where X_{1c} = *calculated fabricated structural steel shipments in thousands of tons*

X_2 = *new industrial building construction in millions of dollars* (1947-1949 *prices*)

X_3 = *new warehouse, office and loft buildings construction in millions of dollars* (1947-1949 *prices*)

X_4 = *new highway construction in millions of dollars* (1947-1949 *prices*)

Constant Revision — As 1956 unfolds, Mr. Schein will revise his calculations on the basis of construction put in place. For instance, the prediction of 1955 shipments is based on the latest available figures projected on an annual rate. Using this technique, it will be possible to begin predicting 1957 shipments of fabricated structural steel about mid-1956 when the construction industry starts looking ahead to the next year. As that year comes into sharper focus during the third and fourth quarters, so will the estimate.

Admittedly, a direct approach to forecasting future demand would be desirable. However, this is not possible for fabricated structural steel because of the diversified nature of the products and the overwhelming number of consumers. But Mr. Schein feels that this indirect approach, based on an activity which is more easily predicted, is the next best method of evaluating the over-all market potential.

Structural Shapes . . .

Structural Shape Prices, Page 86

Structural steel fabricators are booked up months ahead. Many medium-sized shops have backlogs extending eight to ten months, larger shops, eleven to twelve months. Most of them could give better delivery if more steel were available, but there is little prospect for some time.

Substantial awards feature the market in the New York area. Included are two 9000-ton power plants for the Consolidated Edison Co. and several other jobs requiring over 3000 tons each.

Steel Bars . . .

Bar Prices, Page 86

Some large producers of hot-rolled carbon bars haven't opened order books for March. They are proceeding month to month in an effort to keep arrearages in check. Others have long since closed out their schedules for the first quarter.

Inquiry for cold-drawn bars and hot and cold-rolled alloy bars is described as good, but is not so pressing as that for hot-rolled carbon.

Cold-drawn mills are entertaining more demand than they can readily accommodate, though their drawing and processing facilities are running at less than capacity in many sizes. Inability to obtain hot-rolled supplies is the answer.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 87 & 88

Sheetmakers are aware of the slackening pace of automobile assembly but see no implications involving automotive sheet requirements. The feeling is that conversion and warehouse purchases will be first to reflect any slackening in demand for steel. Barring deep schedule reductions, auto builders are thought likely to require all the cold-rolled and hot-rolled sheets the mills can ship in the first quarter.

The mills are booking new business cautiously to guard against overselling. They are booked up solidly for the first quarter with little more than half production in that period available for new tonnage orders. Most of them hope to be more nearly current with demand in the second quarter.

More producers have announced increases in prices on cold-finished, spring-steel strip.

Detroit Steel Corp. revised its method for figuring prices on low-carbon, cold-rolled strip ordered in cut lengths. New extras are added to the price of coil strip for straightening and cutting to length in any width and gage. This is similar to the method for pricing sheets.

Allegheny Ludlum Steel Corp., Pittsburgh, has increased prices on sheets made of one of its patented high temperature alloys, A-286. The new base price is $3 per pound, effective Dec. 20. The steel, developed as forging material for use in jet aircraft engines, now has important uses in sheet form.

Plates . .

Plate Prices, Page 86

Never before in peacetime have the plate mills closed out a year with so much work in prospect. While some producers have not even opened their books for March orders, the business is there—not only for that month but for the entire first half.

Demand is heavy from all sides, except possibly shipbuilding. Even that area is showing some signs of picking up. Railroad car requirements are tremendous.

Reports of premium prices being paid for plates are increasing.

Ferroalloys . . .

Ferroalloy Prices, Page 100

Climax Molybdenum Co., New York, increased prices on molybdenum products an average of 5 per cent, effective Dec. 15. Products involved include the various forms of molybdic oxide used in metalmaking, chemistry and pigments, and various forms of ferromolybdenum used as alloying materials by the steel and foundry industries.

Pure molybdic oxide was increased 5 cents per pound to $1.10 per pound of product. Technical molybdic oxide went up 6 cents per pound of contained molybdenum, prices now ranging from $1.30 to $1.33 depending upon the form. Various forms of molybdenum were increased by 8 cents per pound to $1.54 per pound of contained molybdenum. Powdered molybdenum advanced 9 cents to $1.66 per pound. Slight changes were effected in quantity extras. Concentrated molybdenum ore was raised from $1.05 to $1.10 per pound of contained molybdenum.

Titanium Alloy Mfg. Division, National Lead Co., New York, announced price increases in its high carbon ferrotitanium alloy (7-8) and its medium carbon ferrotitanium alloy (3-5). The high carbon alloy was increased from $187 to $200 per ton, and the medium carbon from $215 to $225. The higher prices become effective Jan. 1 and reflect increased production costs.

Tubular Goods . . .

Tubular Goods Prices, Page 90

First quarter production of oil country goods is reported sold out, and the second quarter is expected to see a continuance of strong demand. The trend continues toward deeper wells. More high-alloy tubing is needed for high-pressure applications.

Sales of specialty tubing are heavy. Producers report full order books for the first quarter. Seamless boiler tube sales are rising, reflecting increasing demand on public utility account.

U. S. Steel Export Co. announced revisions in mill prices for standard and line buttweld pipe when changes in domestic prices were made public by the National Tube Division, U. S. Steel Corp. Reflecting a reduction of $2 per net ton, the new schedule became effective Dec. 13.

Wire . . .

Wire Prices, Pages 88 & 89

Inquiry for wire rods and manufacturers wire continues strong. Some producers are sold up for the first quarter. Demand for merchant wire products is seasonally sluggish.

February mill schedules of most New England producers are closed. Tonnage for processing through March and into the second quarter is substantial. Mills are insisting on longer lead time.

Imported Steel Prices Rise

The price uptrend of steel imported from western Europe continues. Sharpest rise is in plates, up $1.55 per 100 lb. Hot-rolled sheets are up $1. Virtually all other products, except nails, are higher. Nails have been reduced 15 cents per 100 lb, reflecting sharp competition, largely from Japan.

Warehouse . . .

Warehouse Prices, Page 91

Demand for all carbon grades of plates, shapes, bars and sheets exceeds supplies held by distributors. This situation will show little, if any, improvement over the next three months.

Most fabricators will close offices and many will close plants for three days, beginning Dec. 31. During December they trimmed purchases of steel items which are in fair supply

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.80	6.80	6.80	7.20
Structural Angles	6.80	6.80	6.80	7.20
I-Beams	6.80*	6.80*	6.80*	7.20*
Wide Flange Beams	6.80	6.80	6.80	7.20
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	9.00	9.00	9.00	9.40
Furring Channels, C.R., 1000 ft, ¾ x 0.50 lb per ft	28.43	28.43	28.43	30.26
Barbed Wire (†)	6.05	6.05	6.05	6.35
Merchant Bars	6.80	6.80	6.80	7.20
Hot-Rolled Bands	6.80	6.80	6.80	7.20
Wire Rods, Thomas Commercial No. 5	6.25	6.25	6.25	6.65
Wire Rods, O-H Cold Heading Quality No. 5	6.75	6.75	6.75	7.15
Bright Common Wire Nails	7.50	7.50	7.50	7.90

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb, net, reel. ‡Per 100-lb kegs. 20d nails and heavier.

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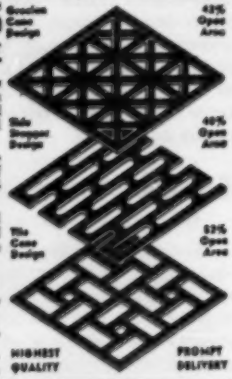

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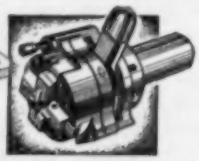

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Scrap . . .

Scrap Prices, Page 96

Philadelphia — Scrap prices continue to advance under pressure of strong demand on both domestic and export account. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are quoted at $52, delivered. No. 2 heavy melting is $48, and No. 2 bundles is $43. Short shovel turnings are higher at $39; heavy turnings, $48; low phos structurals and plates, $54-$55; couplers, springs and wheels, $56; and rail crops $64-$65. Malleable has jumped $3.50 to $66. Heavy breakable is higher at $52-$53.

New York—Brokers have advanced buying prices on No. 1 heavy melting steel and No. 1 bundles to $47-$48; on No. 2 heavy melting to $43-$44; on No. 2 bundles to $38-$39; and on low phos structurals and plate to $48-$49. They also advanced offers on No. 1 cupola to $47-$48 and on heavy breakable to $45-$46.

Buffalo—The local scrap market is maintaining strong tendencies during the holiday lull. Despite cold weather, dealers are busy shipping against old orders.

Pittsburgh—A major Pittsburgh steel producer bought No. 1 heavy melting scrap last week at $50 a ton. The purchase was too small to establish a firm quotation, and prices are fluctuating between $50 and $51. Railroad lists closed last week, with No. 1 heavy melting at $56 a ton.

Cleveland—No. 1 grades of steelmaking scrap advanced $1 a ton here last week on a representative purchase by a local mill. The market on these grades ranges $51-$52. Sentiment continues strong despite general sluggishness attending the holiday season. Some seasonal slowing down in manufacturing operations is noted. This is resulting in a decline in scrap receipts at dealers' yards.

Chicago—Steel mills are doing little new buying. A few grades are down, No. 1 being off about $1. Up $1 are No. 1 factory bundles at $53-$54; No. 1 dealer bundles at $52 and No. 2 bundles at $41 are up about $3. No. 1 railroad heavy melting is $56, up $1.

Cincinnati—The tone of the scrap market continues strong. Prices are firm and are expected to hold present levels until after the turn of the year.

Birmingham—The steel scrap market continues strong, especially electric furnace grades. No. 1 heavy melting and No. 1 bundles have advanced $1 a ton, but No. 2 is unchanged. Material is beginning to move into yards in increasing volume, particularly in the Atlanta area where prices are reported higher than here. An Atlanta mill is reported paying $47 for No. 1 steel, delivered plant.

Los Angeles—Dealers expect scrap prices to remain stable until late in January. A year-end pickup in collections is thought likely to prevent supply shortages, predicted earlier this quarter.

San Francisco—Heavy demand for scrap, on both domestic and export account, has resulted in further price increases. Quotations are up $1 to $4 a ton on all grades. No. 1 heavy melting, up $3, is bringing $42. Clean auto cast is quoted $5 higher at $50 and drop broken machinery is up $2 to $50.

Seattle—Electric furnace grades, No. 1 cupola cast and heavy melting steel have been leading the scrap market to higher price levels. Turnings have held stationary. They do not figure prominently in export trade. Adverse weather is hindering shipments from interior points to dealers' yards.

Pig Iron . . .

Pig Iron Prices, Page 91

Pig iron consumers have been alerted to the possibility of a price increase by the continued advance in scrap prices and recent increases in coke and ferroalloy quotations the past week or so.

A number of foundries have arranged to receive pig iron shipments this week while their plants are shut down for inventory taking and holiday observance. This is being done in an effort to beat the possible price increase.

Movement of pig iron is expected to rebound rapidly after the turn of the year. It quickened this month over the November rate and likely will hold at the higher level through the first quarter.

Iron Ore . . .

Iron Ore Prices, Page 98

Consumption of Lake Superior iron ore in November totaled 7,488,457 gross tons, reports the Lake Superior Iron Ore Association. This compares with 7,850,438 tons in October and 5,845,262 in November a year ago.

Cumulative consumption to December this year was 80,743,647 tons, compared with 60,686,161 in the like period of 1954.

Stocks of ore on lower lake docks and at furnaces on Dec. 1 amounted to 51,040,154 gross tons. This was an increase, compared with 49,523,032 tons on Nov. 1 and with 49,975,495 on Dec. 1 last year.

There were 190 blast furnaces active on Dec. 1 out of a total of 205 in the U. S. and Canada. This is two fewer than on Nov. 1, but is up sharply from the 161 in blast on Dec. 1, 1954.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 89

Industrial fasteners for structural fabricators and the railroads are indirect victims of the shortage of structural shapes. While demand from fabricators is strong, their activity is limited by the shortage of structural steel. Orders for bolts are being postponed awaiting structural deliveries. Fastener makers expect active demand in the first half of 1956.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 98

Effective Dec. 19, the New England Coke Co., subsidiary of Eastern Gas & Fuel Associates, Boston, increased the price of foundry coke $1.50 per net ton to $28.55, f.o.b. Everett, Mass.

Oven coke prices also have been advanced at other eastern furnaces. The Kearny, N. J., ovens are quoting at $1.25 per ton higher, Camden, N. J.; Philadelphia and Swedeland, Pa., ovens $1.50.

Beehive coke prices are firming. Average paid for furnace coke at Connellsville, Pa., in November was about $13.75 per net ton. Prices up to $15 are reported for special requirements.

Rails, Cars . . .

Track Material Prices, Page 89

The New York Central Railroad has closed on the largest freight car order in recent years. A total of 17,750 cars are involved.

Purchases comprise a list of 14,750 units inquired for a few weeks ago and 3000 on which bids recently were asked by the Pittsburgh & Lake Erie, a New York Central subsidiary.

Canadian National Railways has ordered 2645 freight cars for delivery in 1956. Estimated cost: $24 million. Eastern Car Co., Trenton, Nova Scotia, will build 700 fifty-ton boxcars and 100 seventy-ton gondolas; Canadian Car & Foundry Co., Montreal, 900 fifty-ton boxcars and 100 fifty-ton flatcars; National Steel Car Co., Hamilton, Ont., 400 fifty-ton boxcars, 200 fifty-ton and 25 thirty-ton refrigerator cars; Marine Industries, Sorel, Que., 200 seventy-ton covered

(*Please turn to page* 98)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 21	$50.67
Dec. 14	50.17
Nov. Avg.	46.08
Dec. 1954	32.58
Dec. 1950	45.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*41.00-42.00*
No. 1 busheling	*50.00-51.00*
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft lengths	*56.00-57.00*
Heavy turnings	43.00-44.00
Punchings & plate scrap	*56.00-57.00*
Electric furnace bundles	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	*44.00-45.00*
Heavy breakable cast	*44.00-45.00*
Unstripped motor blocks	*32.00-33.00*
No. 1 machinery cast	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*55.00-56.00*
Rails, 2 ft and under	*67.00-68.00*
Rails, 18 in. and under	*68.00-69.00*
Rails, random lengths	*63.00-64.00*
Railroad specialties	*58.50-59.50*

Stainless Steel Scrap

18-8 bundles & solids	335.00-350.00
18-8 turnings	220.00-230.00
430 bundles & solids	100.00-110.00
430 turnings	63.00-65.00

CLEVELAND

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*51.00-52.00*
No. 2 bundles	36.00-37.00
No. 1 busheling	*51.00-52.00*
Machine shop turnings	26.00-27.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	50.00-51.00
Cut structural plates 2 ft and under	55.00-56.00
Alloy free, short shovel turnings	35.00-36.00
Electric furnace bundles	50.00-51.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Charging box cast	42.00-43.00
Stove plate	50.00-51.00
Heavy breakable cast	41.00-42.00
Unstripped motor blocks	33.00-34.00
Brake shoes	39.00-40.00
Clean auto cast	52.00-53.00
Burnt cast	39.00-40.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Rails, random lengths	65.00-66.00
Cast steel	57.00-58.00
Railroad specialties	60.00-61.00
Uncut tires	57.00-58.00
Angles, splice bars	65.00-66.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	335.00-345.00
18-8 turnings	195.00-205.00
430 clips, bundles, solids	100.00-110.00
430 turnings	58.00-63.00

YOUNGSTOWN

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	52.00-53.00
No. 2 bundles	36.00-37.00
No. 1 busheling	52.00-53.00
Machine shop turnings	29.00-30.00
Short shovel turnings	34.00-35.00
Cast iron borings	29.00-30.00
Low phos.	54.00-55.00
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00

CHICAGO

No. 1 heavy melting	*48.00-51.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 factory bundles	*51.00-54.00*
No. 1 dealer bundles	48.00-49.00
No. 2 bundles	37.00-38.00
No. 1 busheling	*48.00-51.00*
Machine shop turnings	31.00-32.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft	54.00-55.00
Punchings & plate scrap	55.00-56.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	42.00-43.00
Unstripped motor blocks	*39.00-40.00*
Clean auto cast	*55.00-56.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
R.R. malleable	61.00-62.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Angles, splice bars	65.00-66.00
Rails, rerolling	*70.00-72.00*

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	46.00
No. 2 heavy melting	34.00
No. 1 bundles	46.00
No. 2 bundles	32.00
No. 1 busheling	46.00
Machine shop turnings	22.00
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	53.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	36.00
Stove plate	34.00
Heavy breakable	35.00
Unstripped motor blocks	22.00
Clean auto cast	46.00
Malleable	40.00

BIRMINGHAM

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	38.00-39.00
No. 1 bundles	*43.00-44.00*
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Cast iron borings	18.00-19.00
Short shovel turnings	30.00-31.00
Machine shop turnings	29.00-30.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*51.00-52.00*
Structural plate, 2 ft	*50.00-51.00*
Unstripped motor blocks	*39.00-40.00*
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 18-in. and under	*63.00-64.00*
Rails, rerolling	*64.00-65.00*
Rails, random lengths	57.00-58.00
Angles, splice bars	*60.00-61.00*

PHILADELPHIA

No. 1 heavy melting	*52.00*
No. 2 heavy melting	*48.00*
No. 1 bundles	*52.00*
No. 2 bundles	*43.00*
No. 1 busheling	*52.00*
Electric furnace bundles	52.00
Machine shop turnings	36.00
Mixed borings, turnings	36.00
Short shovel turnings	*39.00*
Heavy turnings	*48.00*
Structurals, & plate	*54.00-55.00*
Couplers, springs, wheels	*56.00*
Rail crops, 2 ft & under	*64.00-65.00*

Cast Iron Grades

No. 1 cupola	50.50
Malleable	*66.00*
Heavy breakable cast	*52.00-53.00*
Drop broken machinery	57.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*38.00-39.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	30.00-31.00
Low phos. (structural & plate)	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Unstripped motor blocks	28.00-30.00
Heavy breakable	*45.00-46.00*

Stainless Steel

18-8 sheets, clips, solids	320.00-325.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	36.50-37.00
No. 1 bundles	43.00-44.00
No. 2 bundles	34.00-34.50
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.50-24.50
Short shovel turnings	26.00-27.00
No. 1 cast	37.00-37.50
Mixed cupola cast	35.00-35.50
No. 1 machinery cast	40.00-40.50

BUFFALO

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Mixed borings, turnings	30.00-31.00
Machine shop turnings	28.00-29.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	48.00-49.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	55.00-56.00
Rails, 3 ft and under	57.00-58.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	30.00-31.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	32.50-33.50
Cast iron borings	*28.00-29.00*
Low phos., 18 in.	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	54.50-55.50

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	60.00-61.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	41.50
No. 2 heavy melting	39.00
No. 1 bundles	43.00
No. 2 bundles	35.00
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	41.00
Clean auto cast	47.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	54.00
Rails, 18 in. and under	65.50
Rails, random lengths	61.50
Rails, rerolling	69.00
Angles, splice bars	61.50

SEATTLE

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	40.00
No. 2 bundles	34.00
No. 3 bundles	25.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	*33.00*
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	35.00
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	*42.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*41.00*
No. 2 bundles	*37.00*
No. 1 busheling	*42.00*
Machine shop turnings	*20.00*
Mixed borings, turnings	*20.00*
Cast iron borings	*20.00*
Short shovel turnings	*23.00*
Cut structurals	*44.00*
Heavy turnings	*23.00*
Punchings & plate scrap	*42.00*

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	*50.00*
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	*50.00*

HAMILTON, ONT.

No. 1 heavy melting	*42.50*
No. 2 heavy melting	*39.50*
No. 1 bundles	*41.50*
No. 2 bundles	*36.00*
Mixed steel scrap	*36.00*
Mixed borings, turnings	17.00
Rails, remelting	*52.50*
Busheling, new factory:	
Prepared	*41.50*
Unprepared	*27.50*
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% spot)	26.00-28.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for deliver to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Mo., $134; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	*$13.75-$14.50*
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	*$26.75*
Camden, N. J., ovens	*26.50*
Everett, Mass., ovens	
New England, deld.	**28.55*
Chicago, ovens	25.15
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island (Pittsburgh), Pa., ovens	25.00
Philadelphia, ovens	*26.50*
Swedeland, Pa., ovens	*26.50*
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Diam	Length	Per 100 lb
	GRAPHITE	
	Inches	
2	24	$32.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
	CARBON	
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

(Concluded from page 95)

hoppers. In addition, the Canadian National has on order for 1956 delivery 2375 units of freight equipment costing about $18 million.

Pacific Fruit Express Co., world's largest operator of refrigerator cars (they are jointly owned by the Southern Pacific and Union Pacific railroads) will build 200 mechanically refrigerated "supergiant" cars and 1800 standard refrigerator cars. Construction will be at the Roseville, Los Angeles and Colton shops. Cost: More than $26 million.

Consumers Get More Steel

More finished steel products were shipped during October and the first ten months of 1955 than in any similar periods, reports the American Iron & Steel Institute.

October shipments totaled 7,316,821 net tons, 61,000 above the previous peak for that month—October, 1952. The ten month total was 69,889,424 tons, nearly 1.3 million more than the previous record for the like period in 1953. It was about 17.4 million tons greater than in the same period of 1954.

Sixteen major steel consuming categories received more steel in the first ten months this year than in all of 1954.

Shipments to the automotive industry were 15,461,744 net tons, a record. Railroad transportation received 2,860,581 tons, about 403,000 more than in all of 1954. More than half the railroad steel was for freight and passenger cars and locomotives.

Construction, maintenance and contractors' products received 11,231,341 tons in the period, a record. The container category got a record 5,915,639 tons; warehouses and distributors received 12,955,785 tons, a new high for that category.

Canada . . .

Canadian production of iron and steel rose to an all-time monthly high in October.

Output of ingots and steel for castings was 417,266 net tons, compared with 374,192 in September and 279,320 in October, 1954. For the first ten months, production totaled 3,690,797 tons against 2,631,877 in the like 1954 period.

Pig iron production in October totaled 293,423 tons, against 276,795 in the preceding month and 181,895 in October last year. For the first ten months, output was 2,647,457 net tons, compared with 1,817,323 in the corresponding period of 1954.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

9000 tons, power plant extension, Consolidated Edison Co., Astoria, New York, to American Bridge Division, U.S. Steel Corp., Pittsburgh; also 200 tons of stacks.

9000 tons, power plant, Consolidated Edison Co., Staten Island, New York, to American Bridge Division, U. S. Steel Corp., Pittsburgh; also 200 tons of stacks.

6930 tons, ten grade separations and one-half mile elevated viaduct, Connecticut turnpike, 303-01 and 304-01, Greenwich-Stamford, to Klevens Corp., Yonkers, N. Y.; Poirier & McLane Corp., New York, general contractor.

5070 tons, office building, Union Dime Savings Bank, 6th Ave. and 40th St., New York, through George A. Fuller Co. to the Harris Structural Steel Co., New York.

4560 tons, reconstruction, DeKalb avenue subway station, sections 1 and 2, Brooklyn, N. Y., through Poirier & McLane Corp., general contractor, to Harris Structural Steel Co., New York.

4500 tons, guides and sills, structurals and rails, Barnhart Island power plant, St. Lawrence river project contract P-19, to Alco Products Inc., New York; bids to the New York State Power Authority.

3500 tons, 49 intake gates, Barnhart Island power plant, St. Lawrence river project, to Manning, Maxwell & Moore Inc., Muskegon Heights, Mich., schedule 1; Alco Products Inc., New York, eight service and emergency gates for Massens, N. Y., intake, schedule 2; also schedule 3 covering the manufacture and delivery of equipment; bids Nov. 30 to the New York State Power Authority.

3000 tons, office, 123 William St., New York, placed by Diesel Construction Co., with the Harris Structural Steel Co., New York.

2250 tons, 82 transmission towers, Public Service Electric & Gas Co., Bayway, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

534 tons, 4-story branch, First National Bank, Portland, Oreg., to Bethlehem Pacific Coast Steel Corp., Seattle.

300 tons, powerhouse extension, El Paso, Tex., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Stone & Webster Engineering Corp., Boston, contractor-engineer.

290 tons, blending building and miscellaneous structures, Carbide & Carbon Chemical Co., Seadrift, Tex., to a Texas fabricator.

275 tons, warehouse, Rexall Drug Co., Boston, to Groisser & Shlager Iron Works, Somerville, Mass.

220 tons, state bridge, Union county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Franklin National Bank building, Rockville Center, N. Y., through Niel Nielsen, general contractor, to Kurtz Iron Works, a Long Island, N. Y., fabricator.

150 tons, state bridge, Ulster county, N. Y., through the Pine Brook Construction Co. to the Klevin Engineering Co., New York.

115 tons, state highway bridge, Manchester, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Howard Fleming Co., Portland, Me., general contractor.

100 tons, addition, Armstrong Cork Co., Lancaster, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

11,000 tons, superstructure, Bridgeport harbor bridge, Connecticut turnpike, Project 311-02; length, 2491 ft, 31 in., 23 stringer spans; bids Jan. 9, to Hartford, Conn.; also 1440 tons of reinforcing bars.

8000 tons, superstructure, Fort Pitt bridge, Pittsburgh; bids Jan. 6 direct to state of Pennsylvania; also 615 tons of approach work on which general contract bids will be closed Jan. 6.

4355 tons, state highway bridges, including span over Providence river, North-South freeway, Providence, R. I.; M. A. Gammino Construction Co., Providence, low on general contract; also 1280 tons, reinforcing bars and 89,178 linear ft of foundation piles.

2500 tons, powerhouse extension, New England Power Co., Salem Harbor plant, Salem Harbor, Mass.; bids direct.

1945 tons, nine grade separations, Connecticut turnpike, Project 305-01, Stamford-Darien, Conn., Peter E. Kero Inc., and A. J. Orlando Construction Co., New York, joint bidders, low on general contract; also 1175 tons of reinforcing bars, and 500 tons of reinforcing mat.

1350 tons, five hangars and other construction, Elmendorf Air Base, Alaska; Pacific Alaska Contractors, Tacoma, Wash., low at $2,675,865.

685 tons, five grade separations, Connecticut turnpike, Project 315-02, Orange-West Haben, Conn.; bids Jan. 4, Hartford, Conn.; also 525 tons, concrete reinforcing bars.

655 tons, four 3-span state beam bridges, Manchester, N. H.; bids in to Concord, N. H.

335 tons, also reinforcing, Eagle Gorge dam project bridge, relocation of 4 miles of Northern Pacific Railway; Morrison-Knudsen Co. Inc., Seattle, low at $2,093,754 to U. S. Engineer, Seattle.

300 tons, state bridge work, Vine street, Philadelphia, Lipsett Co., New York and Philadelphia, low on general contract.

185 tons, beams and channels, General Services Administration, San Francisco.

120 tons, two-span steel bridge, Goffstown branch, Boston & Maine Railroad, Manchester, N. H.; Howard B. Fleming, Portland, Me., low on general contract.

100 tons, also reinforcing, laterals and waste-way, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., Jan. 19.

REINFORCING BARS . . .

REINFORCING BARS PLACED

540 tons, seven dormitory units, Elmendorf Air Base, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison-Knudsen Co., Seattle, general contractor.

300 tons, Carroll Catholic College buildings, Helena, Mont., to unstated interest, Reidesel Construction Co., Billings, Mont., general contractor at $1,030,800.

150 tons, synthetic nitrogen plant, Southern Nitrogen Co., Savannah, Ga., to Connors Steel Co., Birmingham; Girdler Co., Louisville, general contractor.

125 tons, Washington state overcrossing, Adams county; to Bethlehem Pacific Coast Steel Corp., Seattle; Goodfellow Bros., Wenatchee, Wash., general contractor, low at $220,849.

REINFORCING BARS PENDING

2430 tons, ten grade separations and one-half mile elevated viaduct, Connecticut turnpike, Projects 303-01 and 304-01, Greenwich-Stamford, Poirier & McLane Corp., New York, general contractor; also 805 tons of steel piling and 475 tons of mat reinforcing.

1965 tons, substructure, Bridgeport harbor bridge, Connecticut turnpike, Project 311-01; bids Jan. 4, Hartford, Conn.; also 5950 tons, steel piles, including 625 tons with points.

1212 tons, state bridge work, Allegheny county, Pa.; bids Jan. 6.

375 tons, also shapes, Idaho state overpass, Canyon county; bids to Boise, Idaho, Dec. 27.

343 tons, Galena Air Base, Alaska, rocket storage, etc.; Peter Kiewit Sons Co., Seattle, low at $434,248.

PLATES . . .

PLATES PLACED

185 tons, propane tanks, Philadelphia Gas Works Co., Philadelphia, to Downington Iron Works, Downington, Pa.

139 tons, Fairchild Air Base, Washington

FOUNDRY RESEARCH METALLURGIST

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1—18" or 20" Roll Turning Lathe, to turn rolls single.

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LARGE MACHINE AND WELDMENT CAPACITY

Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

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Phone: Henry Kingston—Sagamore 2-6500

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FOREMAN FOR SPRING PLANT in Midwest. State age, previous experience and salary expected in your reply. Reply Box 359, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $94; 19-21% Mn, 1-3% Si, $91.50; 16-19% Mn, $89.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnston, Pa., Philo, O.; Tacoma, Wash.; $200, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.00 for each 1% above 81%; subtract $2.00 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 30.95c per lb of contained Mn, carload packed 32c, ton lots 33.5c, less ton 34.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.00c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.35c per lb of contained Mn, packed, carload 23.45c, ton lot 25c, less ton 26.2c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.5c per lb of alloy. Packed, c.l. 12.5c, ton 12.95c, less ton 13.95c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-42%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.26 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Sped Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; *No. 6, 68c; No. 79, 56c, freight allowed.*

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, *freight not exceeding St. Louis rate allowed.*

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.65c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analysing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx, 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, *N. Y.*, lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.35c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.2c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.5c per lb of briquet. c.l. packed, pallets 12.7c, bags 13.5c; 3000 lb to c.l., pallets 13.9; 2000 lb to c.l., bags, 14.7c, less ton 15.6c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.5c per lb of briquet, c.l. packed, pallets, 13.35c, bags 14.15c, 3000 lb to c.l., pallets, 14.55c, 2000 lb to c.l., bags, 15.35c, less ton 16.25. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.3c; 3000 lb to c.l. pallets 9.1c; 2000 to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo cotained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.30 per lb of contained W; 2000 lb W to 5000 lb W, $3.40; less than 2000 lb W, $3.52. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ¼" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 45-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 35-42%, Si 17.19%, Mn 8-11%). C.l. packed 17.2c per lb or alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Elgio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

state, fuel tanks, to Chicago Bridge & Iron Co., Seattle.

60 tons, water storage tank, Benton City, Wash., to American Pipe & Construction Co., Portland, Oreg.

PLATES PENDING

750 tons, fuel storage tanks, Elmendorf Air Base, Alaska; general bids in.

750 tons, fuel storage tanks, Galena Air Base, Alaska, military installation; Peter Kiewit Sons Co., Seattle, apparently low on one schedule.

350 tons, 24 to 60-in. steel water pipe; American Pipe & Construction Co., Portland, Oreg., low at $111,983, to Tacoma, Wash.

275 tons, tanks, bulk storage extension, Loring Air Force Base, Limestone, Me.; bids to Corps of Engineers, Boston.

100 tons, also shapes, 134-ft, $500,000 tug for Oahu Railway & Land Co., Hawaii; Gunderson Bros., Engineering Co., Portland, Oreg., low.

Unstated, 6500 ft of H-piling, Eagle Gorge dam project, Seattle; Morrison-Knudsen Co., Seattle, low to U. S. Engineer.

RAILS, CARS . . .

RAILROAD CARS PLACED

Boston & Maine, 1000 freight cars to the Pullman-Standard Car Mfg. Co., Chicago. List comprises 439 boxcars, 300 hoppers, 100 flatcars, 26 covered hoppers and 35 milk cars.

Central of Georgia, 25 seventy-ton covered hoppers to Pullman-Standard Car Mfg. Co., Chicago.

Central Railroad of New Jersey, 100 seventy-ton hoppers to Pullman-Standard Car Mfg. Co., Chicago.

Detroit, Toledo & Ironton, 175 fifty-ton boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Duluth, South Shore railroad, six freight cars to General American Transportation Corp., Chicago.

Merchants Dispatch Transportation and Northern Refrigerator Line, 1000 forty-ton refrigerator cars, placed jointly with Pacific Car & Foundry Co., Renton, Wash.

Merchants Dispatch Transportation, 50 mechanically activated refrigerator cars to Pacific Car & Foundry Co., Renton, Wash.

Minneapolis & St. Louis, 50 seventy-ton covered hoppers to Pullman-Standard Car Mfg. Co., Chicago.

New York Central, 17,750 freight cars as follows: 9250 seventy-ton hoppers, of which 1500 went to ACF Industries Inc., New York; 500 to General American Transportation Corp., Chicago; 1000 to Greenville Steel Car Co., Greenville, Pa.; 5250 to Despatch Shops Inc., East Rochester, N. Y. 500 seventy-ton covered hopper cars went to Pullman-Standard Car Mfg. Co., Chicago; 5000 boxcars to Despatch Shops Inc. This latter list comprised 1500 forty-ft six-in. standard boxcars, 2000 fifty-ft six-in. standard boxcars, 500 fifty-ft six-in. boxcars of the so-called damage-free type, and 1000 fifty-ft six-in. boxcars equipped with Evans automatic loaders. Of the 3000 seventy-ton hopper cars recently brought out for the Pittsburgh & Lake Erie, 2000 went to the Bethlehem Steel Co., Bethlehem, Pa. The remaining 1000 cars went to the Merchants Dispatch shops.

Norfolk & Western, ten air-dump cars to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Pittsburgh & West Virginia, 250 freight cars, with 100 fifty-ton boxcars and 50 seventy-ton hoppers going to Pullman-Standard Car Mfg. Co., Chicago, and 100 seventy-ton gondolas to the Bethlehem Steel Co., Bethlehem, Pa.

Southern Railway, 2800 freight cars; 2000 boxcars, 500 coal and 100 side-dump hoppers going to the Pullman-Standard Car Mfg. Co., Chicago, 100 flatcars to the Thrall Car Mfg. Co., and 100 gondolas to the Greenville Steel Car Co., Greenville, Pa.

Union Pacific, 1000 fifty-ton boxcars to own shops and 100 seventy-ton hoppers to General American Transportation Corp., Chicago.

RAILS PENDING

Alaska Railroad, 16,000 tie plates, 3450 track bolts, 40,000 spikes; bids to Federal Supply Services, Seattle, Jan. 3.

Advertising Index

Allis-Chalmers 55
American Chain & Cable, American Chain Division 12
Armco Steel Corporation 26
Automatic Transportation Co., Division of The Yale & Towne Manufacturing Co. 25

Bethlehem Steel Co. 1, 102
Bullard Co., The 42

Cattie, Joseph P., & Brothers, Inc. 94
Cincinnati Shaper Co., The 8, 9
Cleveland Worm & Gear Co., The ..... Inside Back Cover
Colorado Fuel & Iron Corporation, The 14, 15, 69
Copperweld Steel Co., Steel Division 43
Crucible Steel Company of America 13
Cutler-Hammer, Inc. ..... Back Cover

Dempster Brothers 74, 75
Diamond Manufacturing Co. 94

Eastern Machine Screw Corporation, The 94
Easton Car & Construction Co. 70
Electric Controller & Mfg. Co., The ..... Inside Front Cover

Fenn Manufacturing Co., The 10
Freeway Washer & Stamping Co. 94

Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 4

Hanna Furnace Corporation, The 48
Hoover Ball & Bearing Co. 5
Hyde Park Foundry & Machine Co. 101

Jones & Laughlin Steel Corporation 97

Kling Bros. Engineering Works 3

Link-Belt Co. 7
Lukens Steel Co. 20

McKay Machine Co., The 37
Morgan Engineering Co., The 11

National Steel Corporation 48

Peters-Dalton, Inc. 53

Republic Steel Corporation 40, 41
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 69
Rotary Electric Steel Co. 99
Ryerson, Joseph T., & Son, Inc. 28

Simmons Machine Tool Corporation 85
SKF Industries, Inc. 2

Teiner, Roland, Co., Inc. 49
Texas Co., The 22
Thomas Machine Manufacturing Co. 85
Timken Roller Bearing Co., The, Steel & Tube Division 46
Tinnerman Products, Inc. 50

Wean Equipment Corporation 18, 19
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 14, 15

Yale & Towne Manufacturing Co., The, Automatic Transportation Co. Division 25
Youngstown Sheet & Tube Co., The 17

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Table of Contents, Page 5

Classified Advertising, Page 99

Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Rolling Mill Equipment

For more than 50 years Hyde Park Steel Mill equipment has been helping American industry lead the world—equipment such as—

Bar Mills
Merchant Mills
Sheet and Strip Mills
Pinion Stands
Roller Tables
Reduction Drives
Stretcher Levellers
Guillotine Shears
Sheet Mill Shears
Roll Lathes
Special Machinery
Machine Work

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

Hottest Idea in Home Heating

Home-builders today are turning more and more to the relatively new and economical radiant baseboard system of heating. Just in the past five years the use of radiant baseboard has multiplied several times over. And a principal material in radiant baseboard heating is sheet steel.

Bethlehem supplies much of the sheet steel that goes into this new kind of home-heating system, as well as for the familiar warm-air ductwork. But the installation of heating systems is only one of many activities whose consumption of Bethlehem sheets has grown tremendously in recent years.

Room air-conditioners, television cabinets, galvanized steel products, agricultural machinery, ironing boards — these and many other items are enjoying a recent upsurge in popularity. A popularity accounted for in no small measure by the strength and workability of steel sheets.

Meanwhile, the demands of longer established sheet users continue apace. All of which makes it easier to understand why Bethlehem is being called on to produce hot- and cold-rolled sheets in larger volume than ever before. We are making every effort to overtake the unprecedented demand.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SHEETS

BETHLEHEM STEEL

Spurgeon Automation Unit on the test floor of the Spurgeon Company at Van Dyke, Mich. Note the vital points where Clevelands are installed—a small unit (20AT) driving the feed mechanism and two 70ND units, one at each end of the elevator lift.

Spurgeon automation unit employs three CLEVELANDS

IN a Detroit automotive plant, three Spurgeon units automatically elevate, transfer and feed steel bars into bar cut-off machines. Top production is gained and hours of man power and money are saved by automation.

Three Cleveland Worm Gear Speed Reducers are employed on each Spurgeon unit: Two vertical reducers on the mechanical drive that operates the elevator; a third Cleveland on the "V" Roll Conveyor pushes the rods into the bar cut-off machine.

Automation and Cleveland Worm Gear Speed Reducers go hand-in-hand. Precision matching of case-hardened steel worms to nickel-bronze gears insures 100% dependability. And, the compact, right-angle Cleveland design saves space and makes installation easy.

Find out what Cleveland can do for your operations before you buy. Catalog 400 gives the story. The Cleveland Worm and Gear Co., 3270 E. 80th St., Cleveland 4, O.

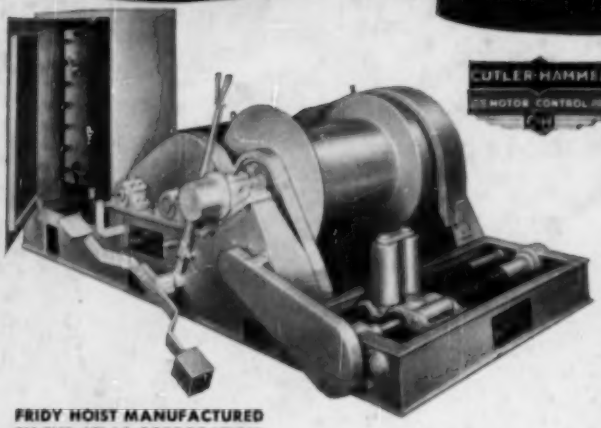
Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

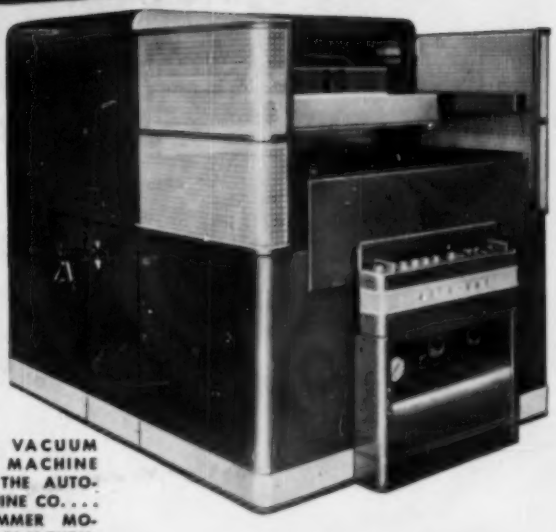
Choice of the Leaders

CUTLER-HAMMER
MOTOR CONTROL
C-H

The Mark of Better Machines

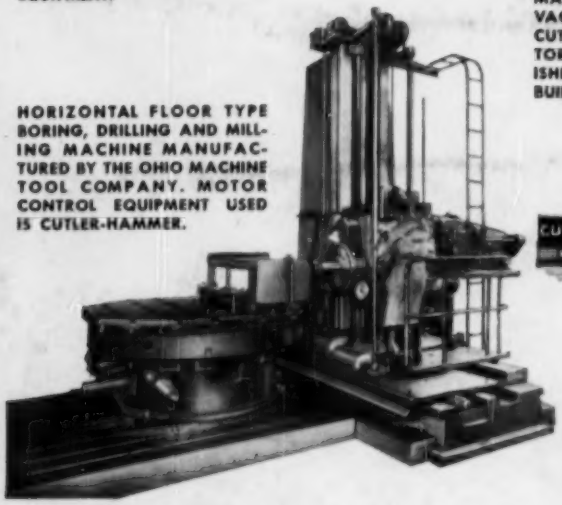


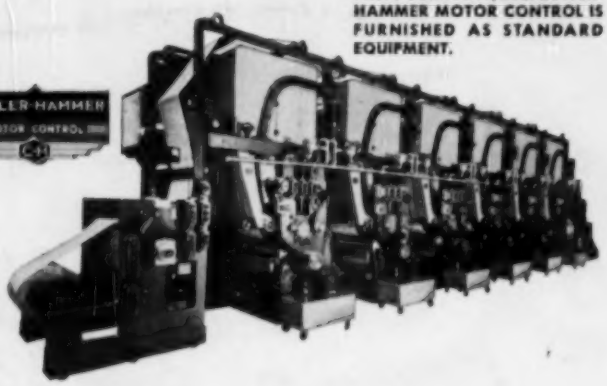
FRIDY HOIST MANUFACTURED BY THE ATLAS CORPORATION. CUTLER-HAMMER MOTOR CONTROL IS FURNISHED AS STANDARD ELECTRICAL EQUIPMENT.



PLASTICS VACUUM FORMING MACHINE MADE BY THE AUTO-VAC MACHINE CO.... CUTLER-HAMMER MOTOR CONTROL IS FURNISHED AS STANDARD BUILT-IN EQUIPMENT.

HORIZONTAL FLOOR TYPE BORING, DRILLING AND MILLING MACHINE MANUFACTURED BY THE OHIO MACHINE TOOL COMPANY. MOTOR CONTROL EQUIPMENT USED IS CUTLER-HAMMER.





HEAVY DUTY GRAVURE PRESS MANUFACTURED BY KIDDER PRESS COMPANY, INC. CUTLER-HAMMER MOTOR CONTROL IS FURNISHED AS STANDARD EQUIPMENT.

The truth will out

In these days of fast and utter communication, the status of *any* commercial product cannot long remain hidden. Sooner or later it becomes known and you have the spectacle of more and more people gravitating to a single product; more and more favoring one product above all others in its field; because in truth it is best in their eyes, best fitted to their many and varied needs, most satisfying in every respect.

That goes for products as costly and valuable and important as production machinery used by vast organizations of people to turn out other commercial products, where a mistaken selection of equipment can be a costly setback or a major catastrophe in the never-ending battle for sales. It goes for products such as Motor Control, installed by production machinery builders to guide and control and protect the performance of the machines on which they build such high market hopes. And here too the truth will out and more and more leaders in machinery building are gravitating to Cutler-Hammer Motor Control . . . known by most people if not by all to be the leader in its field ever since its inception more than sixty years ago. Specify Cutler-Hammer and be sure . . . CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.